



## Workshop Manual SpaceFox, Space Cross, Suran, Suran Cross, Sportvan 2006 ➤

5-speed manual gearbox 02T and 0AP

Edition 05.2011





## List of Workshop Manual Repair Groups

### Repair Group

- 00 - Technical data
- 30 - Clutch - control system
- 34 - Drive, housing
- 35 - Gears and shafts
- 39 - Transmission shafts, differential



Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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## 00 – Technical data

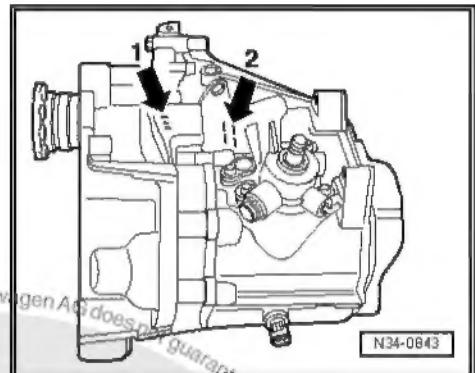
### 1 Transmission identification

The 5-speed manual gearbox 02T and 0AP is installed in the SpaceFox, Suran and Sportvan 2006 ➤.

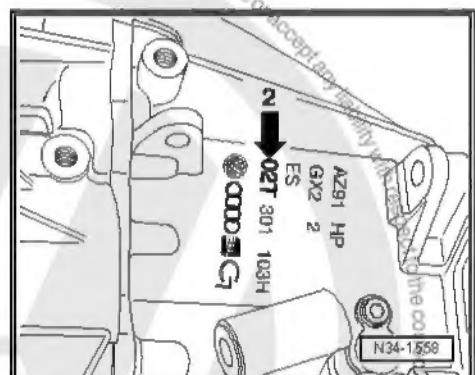
Allocation [page 1](#).

#### 1.1 Location on transmission

Prefixes (Identification letters) and manufacturing date -arrow 1- "5-speed stick manual gearbox 02T" -arrow 2-.

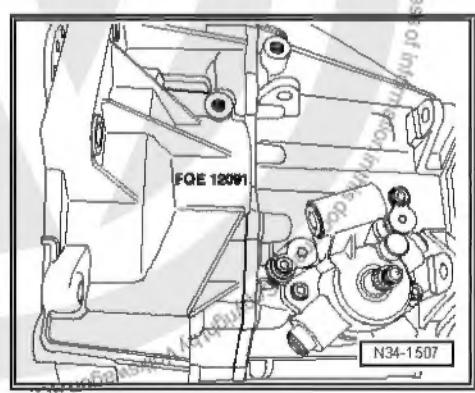


"5-speed stick manual gearbox 02T" -arrow2-.



Transmission prefix and manufacturing date.

Example:	GQS	12	12	3
	Prefix	Day	Month	Production year
				2003



- ◆ Eventual existing additional data is related to the manufacturing process.
- ◆ The transmission prefixes will also be included on the vehicle ID tag.

#### 1.2 Prefix, correspondence, transmission ratio, filling volume

Manual transmission	5-speed 02T and 0AP			
Code letters	GXS	HSG	JHK	
Manufacturing	from to	08.03	12.04	01.07



Manual transmission		5-speed 02T and 0AP		
Code letters		GXS	HSG	JHK
Allocation		to Model	01.07 SpaceFox 2006 ➤	01.07 SpaceFox 2006 ➤
Transmission ratio $Z_2 : Z_1 :$	Engine	1.6 l - 74 kW Volkswagen AG	1.6 l - 74 kW Volkswagen AG	1.6 l - 74 kW
	Differential	68 : 15 = 4,533 Nissan	68 : 15 = 4,533 Nissan	68 : 15 = 4,533 Nissan
Z <sub>2</sub> : Z <sub>1</sub> :	1nd. gear	38 : 11 = 3,455	49 : 13 = 3,769	49 : 13 = 3,769
	2nd. gear	43 : 22 = 1,955	44 : 21 = 2,095	44 : 21 = 2,095
	3rd. gear	41 : 32 = 1,281	43 : 30 = 1,433	43 : 30 = 1,433
	4nd. gear	38 : 41 = 0,927	41 : 38 = 1,079	41 : 38 = 1,078
	5nd. gear	37 : 50 = 0,740	39 : 48 = 0,813	39 : 48 = 0,812
	6nd. gear	-	-	-
	Reverse gear	35 : 24 x 24 : 11 = 3,182	35 : 24 x 24 : 11 = 3,182	35 : 24 x 24 : 11 = 3,182
Speedometer		Electronic	Electronic	Electronic
Filling capacity		2.0 liters	2.0 liters	2.0 liters
Dimensions	until 11.06	G 052 178 A2		
	of 12.06	G 052 512 A2		
or see ⇒ Chemical material manual				
Clutch drive		Hydraulic		
Clutch disc Ø		200 mm	200 mm	200 mm

Manual gearbox:		5-speed 02T and 0AP		
Code letters		JJZ	KRJ	KWF
Manufacturing	from to	01.07	01.07	03.08
	to			
Allocation	Model	SpaceFox 2006 ➤	SpaceFox 2006 ➤	SpaceFox 2008 ➤
	Engine	1.6 l - 74 kW	1.9 l - 47 kW	1.6 l - 74 kW
Transmission ratio $Z_2 : Z_1 :$	Differential	68 : 15 = 4,533	66 : 17 = 3,882	67 : 16 = 4,187
	1nd. gear	38 : 11 = 3,455	49 : 13 = 3,769	38 : 11 = 3,454
	2nd. gear	43 : 22 = 1,955	44 : 21 = 2,095	43 : 22 = 1,954
	3rd. gear	41 : 32 = 1,281	41 : 32 = 1,281	41 : 32 = 1,281
	4nd. gear	38 : 41 = 0,926	38 : 41 = 0,926	38 : 41 = 0,926
	5nd. gear	37 : 50 = 0,740	37 : 50 = 0,740	37 : 50 = 0,740
	6nd. gear	-	-	-
Z <sub>2</sub> : Z <sub>1</sub> :	Reverse gear	35 : 24 x 24 : 11 = 3,182	35 : 24 x 24 : 11 = 3,182	35 : 24 x 24 : 11 = 3,182
	Speedometer	Electronic	Electronic	Electronic
Filling capacity		2.0 liters	2.0 liters	2.0 liters
Dimensions	until 11.06	G 052 178 A2		
	of 12.06	G 052 512 A2		
or see ⇒ Chemical material manual				
Clutch drive		Hydraulic		



Manual gearbox:	5-speed 02T and 0AP		
Code letters	JJZ	KRJ	KWF
Clutch disc Ø	200 mm	200 mm	200 mm

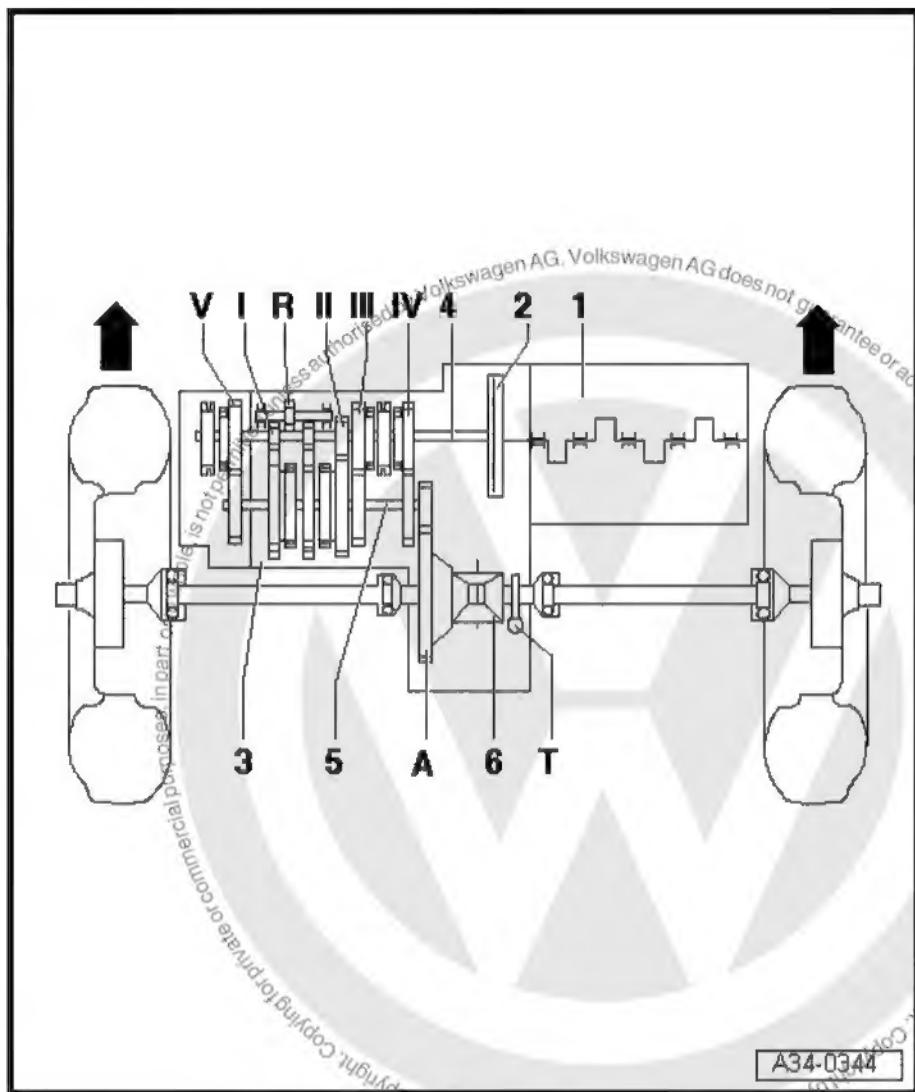
Manual gearbox:	5-speed 02T and 0AP		
Code letters	JHK	LVL	LVW
Manufacturing	from to	10.08	11.09
	to	12.09	-
Allocation	Model	SpaceFox 2008 ➤	Suran 2008 ➤
	Engine	1.6 l - 74 kW	1.6 l - 74 kW
Transmission ratio Z <sub>2</sub> : Z <sub>1</sub> :	Differential	67 : 16 = 4,187	67 : 16 = 4,187
	1nd. gear	38 : 11 = 3,454	38 : 11 = 3,454
	2nd. gear	43 : 22 = 1,954	43 : 22 = 1,954
	3rd. gear	41 : 32 = 1,281	41 : 32 = 1,281
	4nd. gear	38 : 41 = 0,926	38 : 41 = 0,926
	5nd. gear	37 : 50 = 0,74	37 : 50 = 0,74
	6nd. gear	-	-
	Reverse gear	35 : 24 x 24 : 11 = 3,182	35 : 24 x 24 : 11 = 3,182
	Speedometer	Electronic	
Filling capacity		2.0 liters	
Dimensions	until 11.06	G 052 178 A2	
	of 12.06	G 052 512 A2	
		or see ⇒ Chemical material manual	
Clutch drive		Hydraulic	
Clutch disc Ø		200 mm	



## 2 Transmission assembly scheme

### 2.1 Nomenclature

- 1 - Engine
- 2 - Clutch
- 3 - Manual gearbox
- 4 - Primary shaft/driving shaft
- 5 - Secondary shaft/pinion shaft
- 6 - Differential



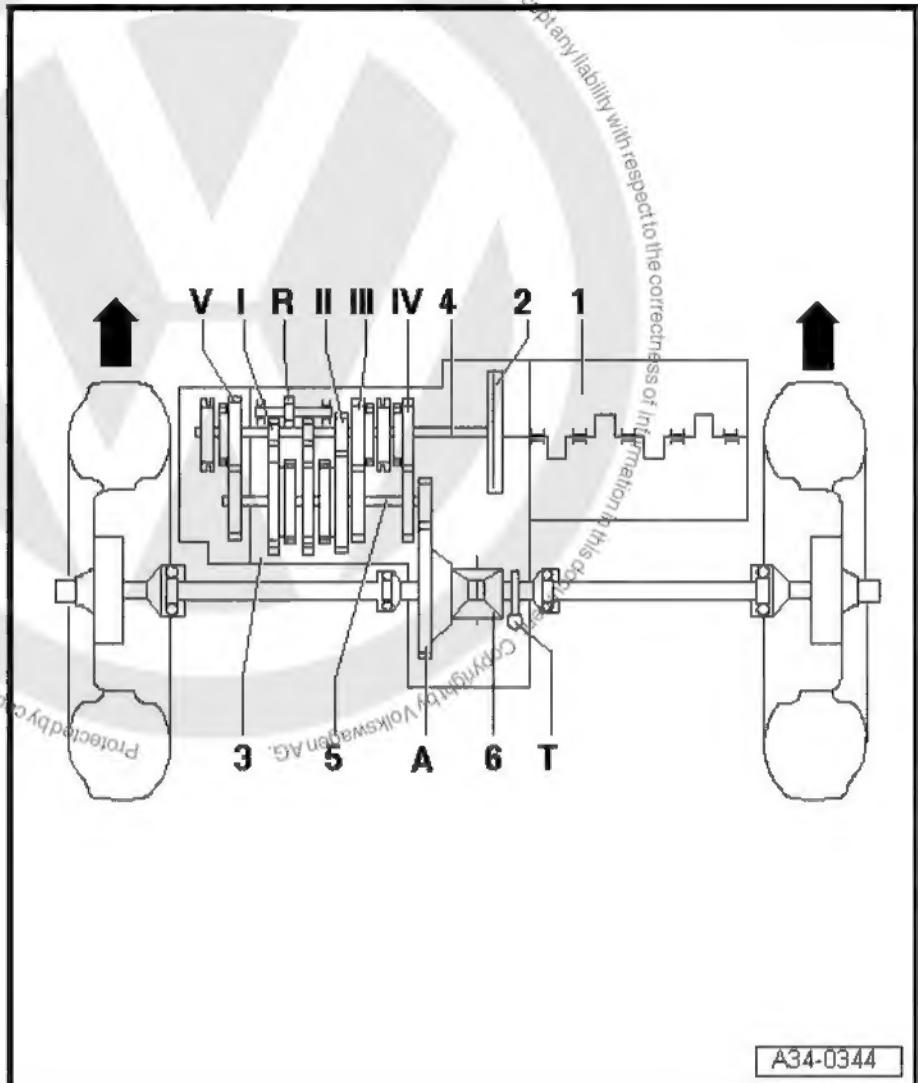
#### Note

The arrows indicate run direction.



## 2.2 Gear ratios

- I - 1nd. gear
- II - 2nd. gear
- III - 3rd. gear
- IV - 4nd. gear
- V - 5nd. gear
- R - Reverse gear
- A - Sprocket
- T - Speedometer control



Note

The arrows indicate run direction.



### 3 Gear ratio calculation "i"

Example:

	5nd. gear	Sprocket
driving gear	ZG <sub>1</sub> = 50	ZA <sub>1</sub> = 18
driven gear	ZG <sub>2</sub> = 37	ZA <sub>2</sub> = 65

$$i = Z_2 : Z_1$$

$$i_G = \text{gearbox ratio} = ZG_2 : ZG_1 = 37 : 50 = 0,740$$

$$i_A = \text{differential gearbox ratio} = ZA_2 : ZA_1 = 65 : 18 = 3,611$$

$$i_{\text{total}} = \text{Overall gearbox ratio} = i_G \times i_A = 0,740 \times 3,611 = 2,672$$

1) Z<sub>1</sub> = Number of teeth of drive gear Z<sub>2</sub> = Number of teeth of driven gear.



## 4 General repair instructions



### WARNING

For achieving a correct and successful repair of the transmission, maximum rigor and cleanliness, as well as accessible tools in good conditions, are essential conditions. Obviously, all the normal basic safety rules also apply in repairs.

We put together here a series of indications applicable to several operations which are usually dispersed along the Repair Manual. These indications apply to this Repair Manual.

- ◆ First, clean the union points and adjacent regions before separating them.
- ◆ Put the disassembled parts on a clean base and cover them to prevent dirt. Use transparent film and paper. Do not use cloths that fray!
- ◆ Assemble only clean parts: Take the parts out of the packaging just before their assembly.
- ◆ Carefully cover or close open components, in case repair is not carried out immediately.

### 4.1 Gearbox

- ◆ When assembling the transmission, pay attention on the correct seating of guide pins between engine and transmission.
- ◆ Whenever the transmission is replaced, fill with oil until the lower edge of the filling hole.
- ◆ Filling capacity and specification [⇒ page 1](#).

### 4.2 Gaskets and retainers

- ◆ Always change O-rings, retainers and gaskets.
- ◆ After removing the gaskets, check whether the stop surface has burrs or damage resulting from the assembly.
- ◆ Before installing the retainers, slightly lubricate the outer diameter and fill the gap between the sealing lips -arrow- with Grease -G 052 128 A1- up to half height. Refer to the ⇒ Chemical Materials Manual





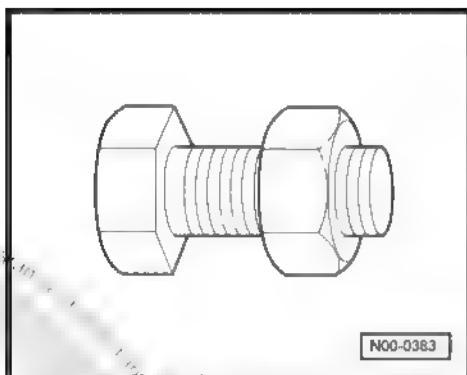
#### 4.3 Screws, nuts

- ◆ Loosen and tighten cover and case fastening screws or nuts in a cross pattern and in stages.
- ◆ The tightening torques indicated apply to non-lubricated screws and nuts.
- ◆ The screw threads with locking paste must be cleaned with wire brush. Install screws with Locking paste AMV 185 100 A1-. Refer to the ⇒ Chemical Materials Manual .
- ◆ All the self-locking screw holes must be cleaned from locking paste residues with screw tap. Otherwise, there is the risk of breaking the screws when they are removed again.



##### WARNING

*Always replace self-locking nuts and bolts which were subjected to angular torque.*



#### 4.4 Roller Bearings

- ◆ Lubricate all the transmission roller bearings with gear oil before installing them
- ◆ Needle roller bearings must fit into the labeled part (highest thickness of the plate), towards the fitting tool.
- ◆ The tapered roller bearings installed in a same shaft must be replaced as a set. If possible, they must be supplied by the same manufacturer.
- ◆ To install, heat inside rings up to approximately 100 °C
- ◆ Do not change outside and inside rings on a roller bearing by the rings from another roller bearing with the same size. Roller bearings are installed in pairs.

#### 4.5 Adjustment shims

- ◆ Check the shim thicknesses in several places with micrometer. The existence of different tolerances enables calibrating the required shim thickness with accuracy.
- ◆ Check for burrs and damages.
- ◆ Only install adjustment shims in perfect conditions.

#### 4.6 Synchronizer rings

- ◆ They should not be inverted. When reusing synchronizer rings, always install them on the same gear pair.
- ◆ Check for wear, and change them, if required.
- ◆ Lubricate with transmission oil before installing.

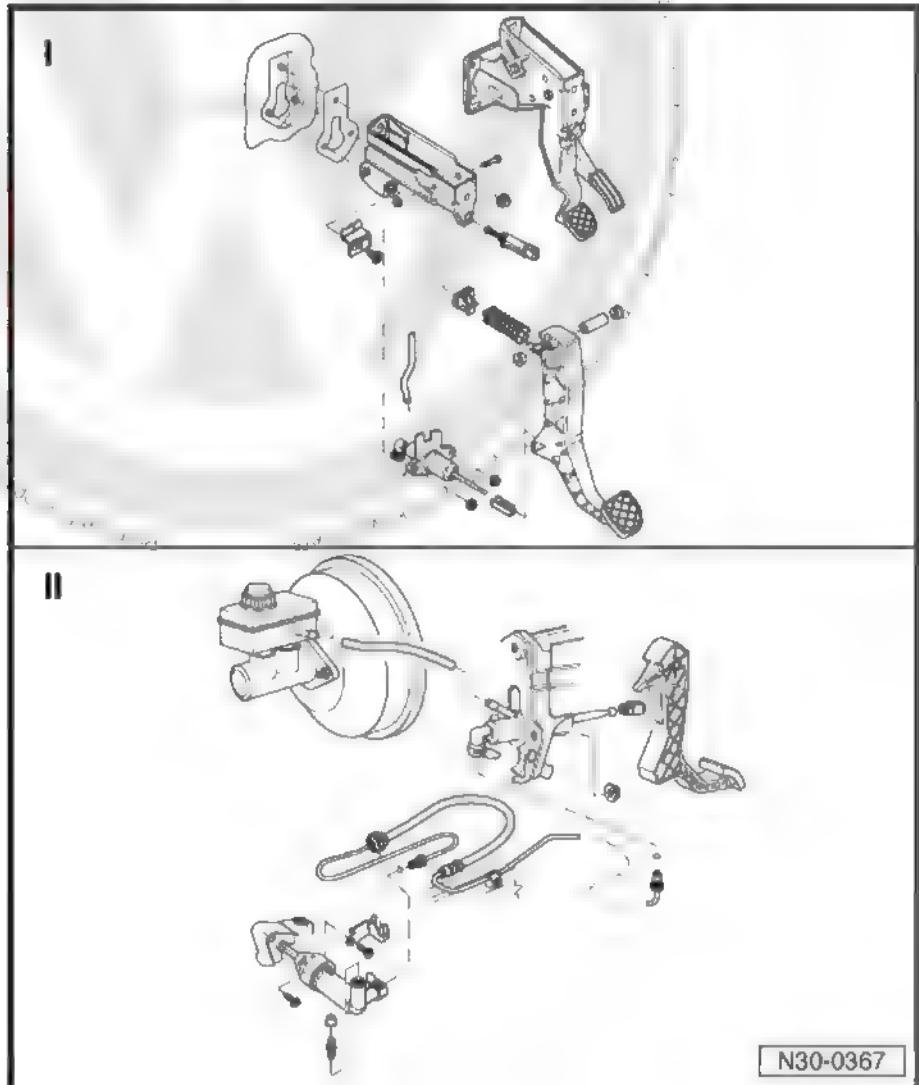


## 30 – Clutch - control system

### 1 Control system - repair

I - Command pedals - assembly overview ➔ [page 9](#)

II - Hydraulic system - assembly overview ➔ [page 18](#)



#### 1.1 I - Command pedals - assembly overview

Self-locking screws and nuts must be replaced whenever loosened and/or removed.



1 - Engine compartment partition panel

- With housing for the clutch support and hydraulic drive cylinder.

2 - Gasket

- Renew whenever removed.

3 - Pedal support

- For the clutch pedal housing.
- Remove and install [page 13](#).

4 - Screw

5 - Pedal support

- For the accelerator and brake pedal housing.

6 - Hexagon nut

- Self-locking.
- 25 Nm.
- Renew whenever removed.

7 - Clutch pedal switch -F36-

- There are two types [page 11](#)

8 - Pedal return spring

- Remove and install [page 12](#).

9 - Bearing bushing

10 - Support pin

11 - Clutch pedal

- Remove and install [page 16](#).

12 - Housing

- Remove and install [Item 5 \(page 18\)](#).

13 - Hexagon nut

- Self-locking.
- 25 Nm.
- Renew whenever removed.

14 - Clutch hydraulic drive transmitting cylinder

- Remove and install [page 19](#).

15 - Safety locks

16 - Supply hose

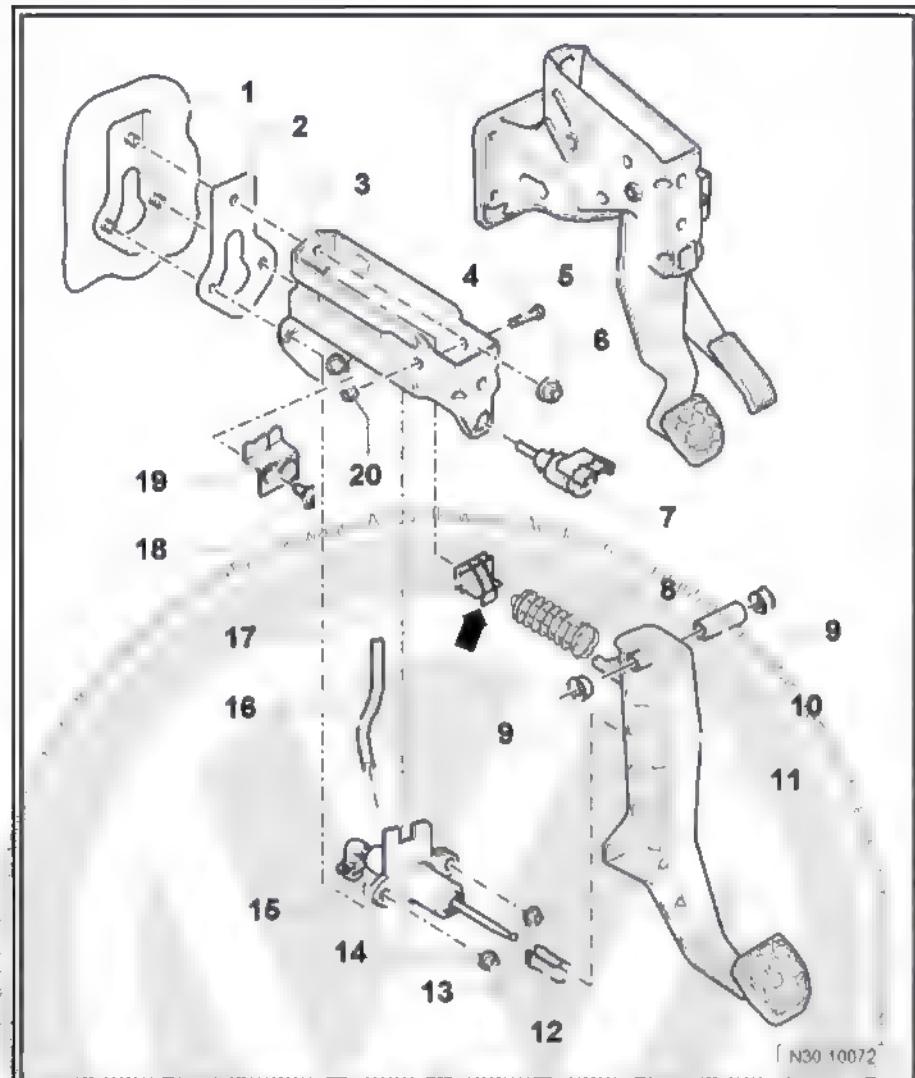
17 - Clutch pedal return spring housing

- Installation position: the latch -arrow- fits in the transmitting cylinder notch.
- Install in the mounting bracket.
- To change, remove and install the transmitting cylinder on the clutch hydraulic drive [page 19](#)

18 - Screw

19 - Limiter stopper

- For clutch pedal.





## 20 - Hexagon nut

- Self-locking.
- 25 Nm
- Renew whenever removed.

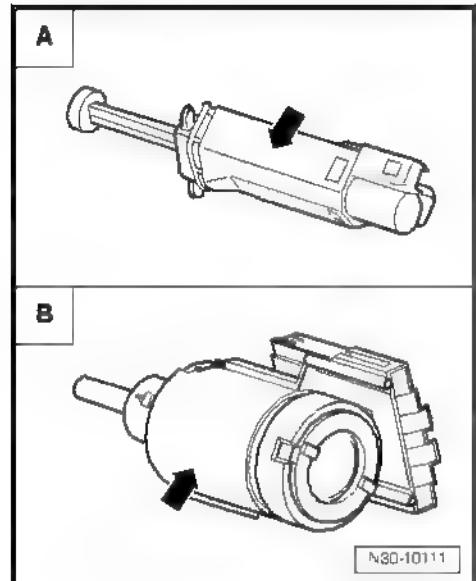
## Types of Clutch pedal switch -F36-

A - Clutch pedal switch -F36- with rectangular case -arrow-.

- Remove and install [⇒ page 11](#)

B - Clutch pedal switch -F36- with round case -arrow-.

- Remove and install [⇒ page 12](#)



### 1.2 Clutch pedal switch -F36- with rectangular case - remove and install

To ensure a seating sufficiently firm on the support, the Clutch pedal switch -F36- must be assembled only once.

#### 1.2.1 Removal

- Disconnect the connector of the Clutch pedal switch -F36- .
- Turn the Clutch pedal switch -F36- 90° in clockwise direction and remove it from support.

#### 1.2.2 Installation

- Pull the shaft ("pin") to the stanchion.
- Press clutch pedal towards the partition panel in the engine compartment.



#### Note

*Before installing the Clutch pedal switch -F36- on the support, apply a small amount of Polyurea Grease -G 052 142 A2- on the "pin" shaft of the clutch switch*

- Install the Clutch pedal switch -F36- on support and fasten it by turning 90° in counterclockwise direction.
- Engage the connector Clutch pedal switch -F36- .



## 1.3 Clutch pedal switch -F36- with round case - remove and install

To ensure a seating sufficiently firm on the support, the clutch pedal switch -F36- must be assembled only once.

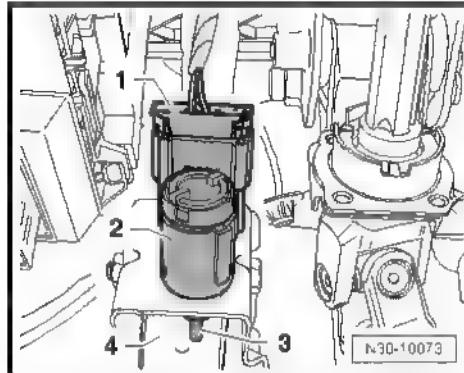
### 1.3.1 Removal

- Pull off connector -1- of Clutch pedal switch -F36- .
- Turn the Clutch pedal switch -F36- -2- 45° in counterclockwise direction and remove it through the support hole.



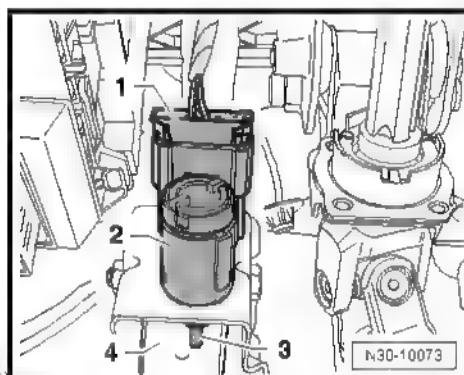
#### Note

*The clutch pedal remains in the rest position (not activated).*



### 1.3.2 Install and adjust

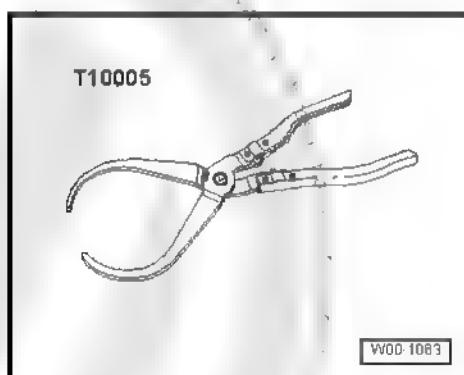
- Before installing the Clutch pedal switch -F36- , pull the shaft ("pin") -3- completely.
- Clutch pedal -4- shall be at rest position.
- Install the Clutch pedal switch -F36- through the support hole and fasten it by turning 45° in clockwise direction.
- Engage the connector Clutch pedal switch -F36- .



## 1.4 Clutch pedal return spring - remove and install

Special tools and workshop equipment required

- ◆ Pliers -T 10005-

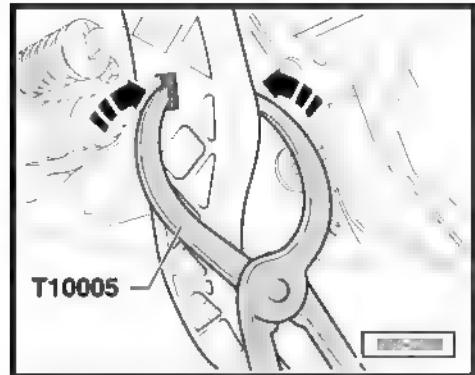


### 1.4.1 Removal

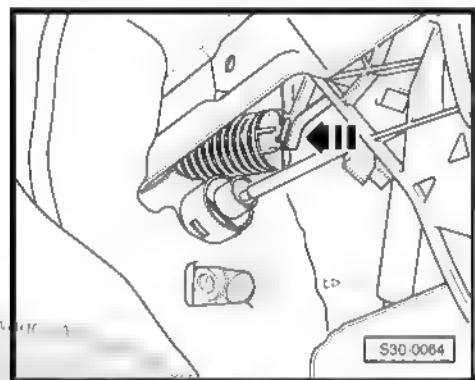
- Remove the Clutch pedal switch -F36- [→ page 11](#)



- Pull clutch pedal slightly towards front seat and press inwards both sides of the housing with Pliers -T 10005- both sides of the housing inwards -arrows-.
- Separate the transmitting cylinder stem from the clutch pedal's hydraulic drive.



- Press the return spring towards the partition panel -arrow- and remove it from downwards.

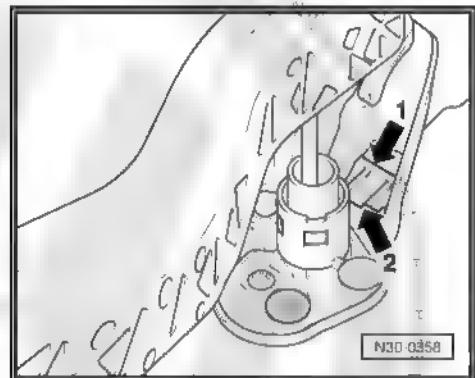


#### 1.4.2 Installation

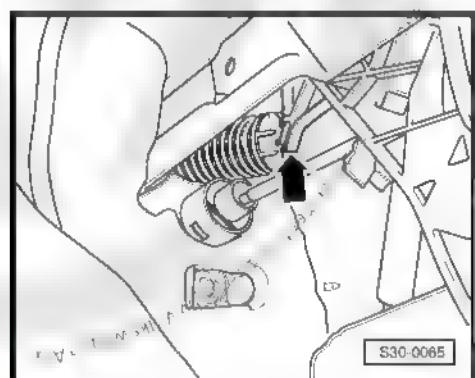
- Check that the support -arrow 1- for the pedal return spring is installed on the support.

Installation position:

- The support tab shall be into the impelling cylinder notch -arrow 2-.



- First, install the pedal return spring on the rear part of the support.
- Then, press the pedal return spring on the support tab -arrow-.
- Install the Clutch pedal switch -F36- [page 11](#)

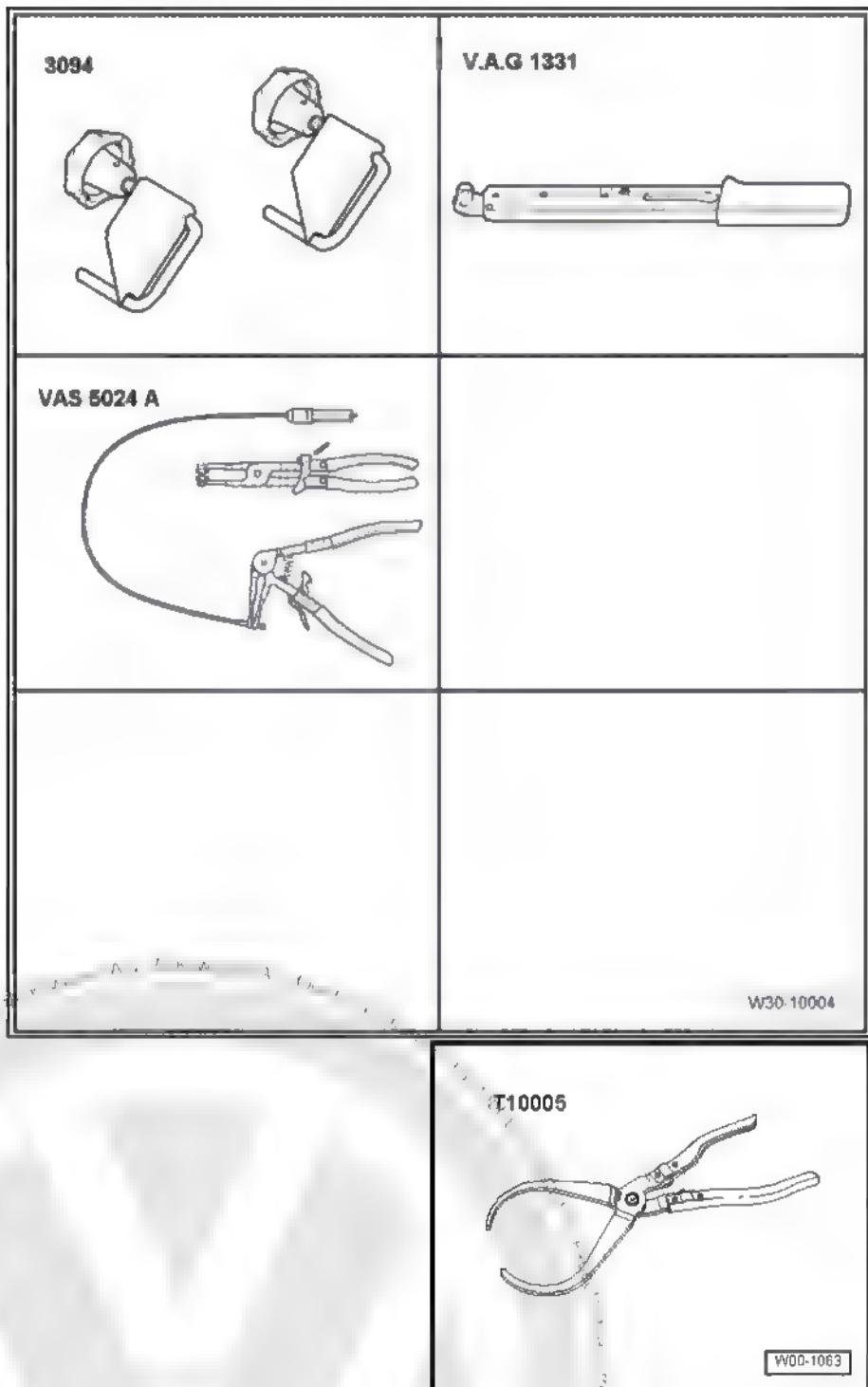


#### 1.5 Clutch pedal support - remove and install



Special tools and workshop equipment required

- ◆ Clamps (diam. 25 mm)  
-3094-
- ◆ Torque wrench - 5 to 50 Nm  
(socket 1/2") -VAG 1331-
- ◆ Standard-type or VW 5162  
clamp pliers -VAS 5024A-
- ◆ Pliers -T 10005-



### 1.5.1 a Removal

- Disconnect the Battery -A- ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .



### Note

- ◆ Check whether the vehicle has a coded radio. If so, request the anti-theft code before disconnecting the Battery's earth strap
- ◆ When the battery is reconnected, check the operation of the vehicle electrical system (radio, clock and electric door and window locks, etc.) according to the Workshop Manual and/or instructions for use.

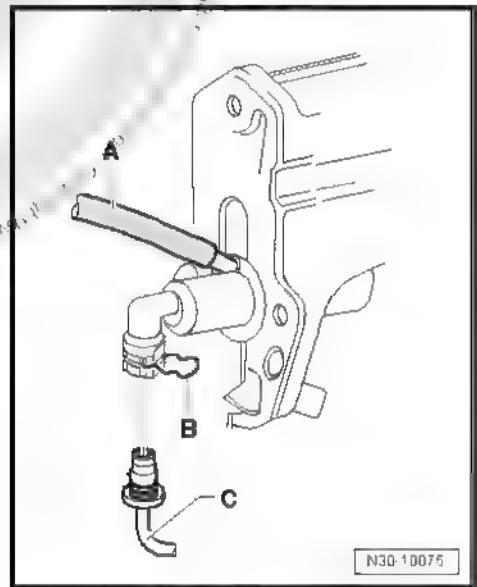
- Pull the harness carefully forwards.
- Place a lint-free cloth sufficiently large under the transmitting cylinder of the clutch hydraulic drive.
- Install Clamp (diam. 25 mm) -3094- on the return hose -A- and release it from the transmitting cylinder.



### Note

If the hose is secured with a spring clamp, release it with Standard-type or VW 5162 clamp pliers -VAS 5024A-.

- Remove clip -B- from the tubing and hose assembly on the transmitting cylinder.
- Remove tubing and hose assembly -C- from the transmitting cylinder and cover it.
- Remove the Clutch pedal switch -F36- [⇒ page 11](#)

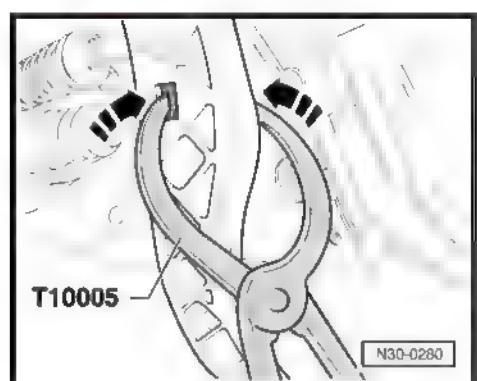


### Note

◆ The clutch pedal support is removed with the transmitting cylinder.

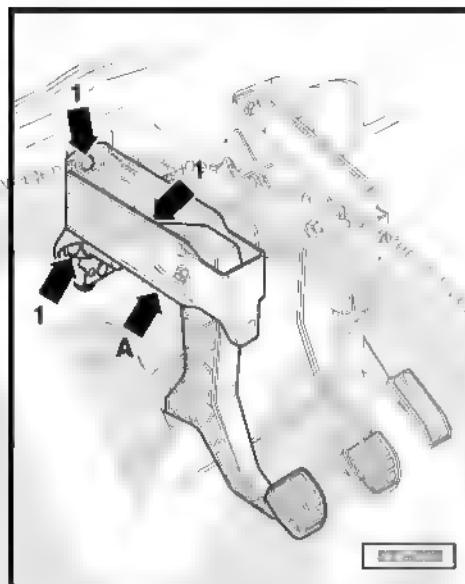
◆ Before removal, it is necessary to separate the transmitting cylinder from the clutch pedal.

- Pull clutch pedal slightly towards front seat and press inwards both sides of the housing with Pliers -T 10005- both sides of the housing inwards -arrows-.
- Separate the transmitting cylinder stem from the clutch pedal's hydraulic drive.





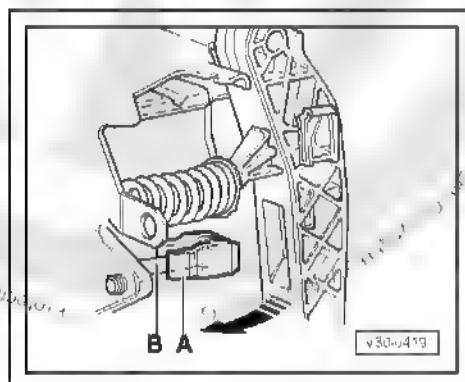
- Loosen the fastening nuts -arrow 1- from the housing support -arrow A-.
- Remove the housing support.
- Remove the cable return spring [⇒ page 12](#).
- Remove the return spring housing from the housing support
- Release the clutch pedal stop.



## 1.5.2 Installation

Install by inverting the removal sequence, paying attention to the following:

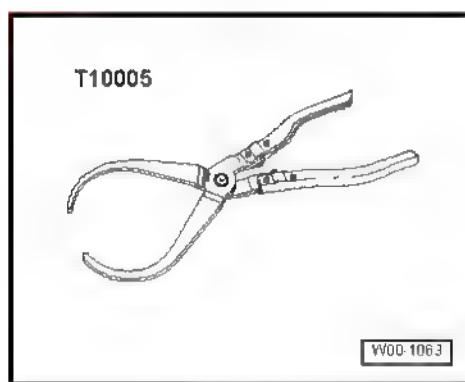
- The housing -A- shall be on the transmitting cylinder stem on the clutch hydraulic drive -B-.
- Press clutch pedal -arrow- to fit the drive stem, make sure the fitting is OK.
- Bleed the clutch system [⇒ page 22](#).
- Mount the clutch pedal switch -F36- [⇒ page 11](#)



## 1.6 Clutch pedal - remove install

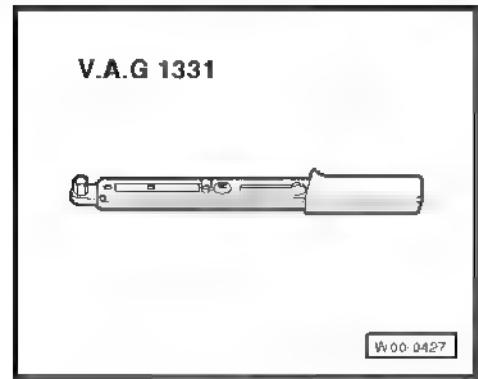
Special tools and workshop equipment required

- ◆ Pliers -T10005-



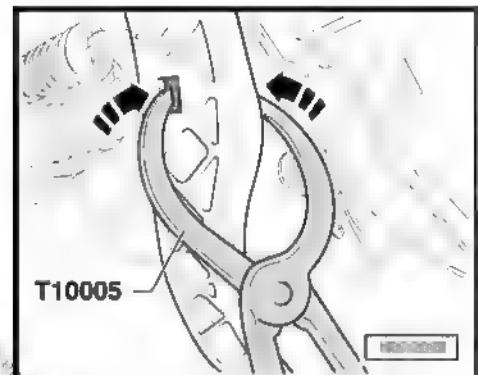


- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-

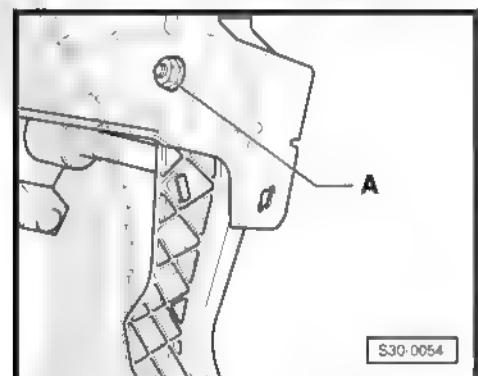


### 1.6.1 Removal

- Remove clutch pedal support [page 13](#).
- Remove the cable return spring [page 12](#).
- Pull clutch pedal slightly towards front seat and press inwards both sides of the housing with Pliers -T 10005- both sides of the housing inwards -arrows-.
- Separate the transmitting cylinder stem from the clutch pedal's hydraulic drive.



- Loosen nut -A- and remove screw.
- Remove clutch pedal.



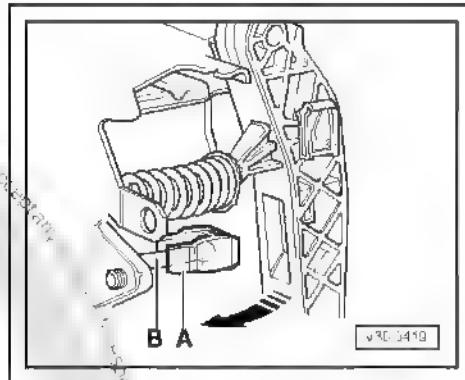
### 1.6.2 Installation

Install by inverting the removal sequence, paying attention to the following:

- Install cable return spring [page 12](#).



- The housing -A- shall be on the transmitting cylinder stem on the clutch hydraulic drive -B-
- Press clutch pedal -arrow to fit the drive stem, make sure the fitting is OK.



## 1.7 II - Hydraulic system - assembly overview

1 - Brake fluid reservoir

2 - Supply hose

3 - Clutch hydraulic drive transmitting cylinder

- Remove and install  
[⇒ page 19](#).

4 - Clamp

- Push to the stop in order to remove and install the pipes and hose assembly.

5 - Housing

- Change only by removing the transmitting cylinder of the clutch hydraulic drive.
- Remove [⇒ page 19](#)
- Install [⇒ page 19](#)

6 - Clutch pedal

- Remove and install  
[⇒ page 16](#).

7 - Hexagon nut

- Self-locking.
- 25 Nm.
- Renew whenever removed.

8 - Seal ring

- Fit on cable connection.
- Lubricate with brake fluid.

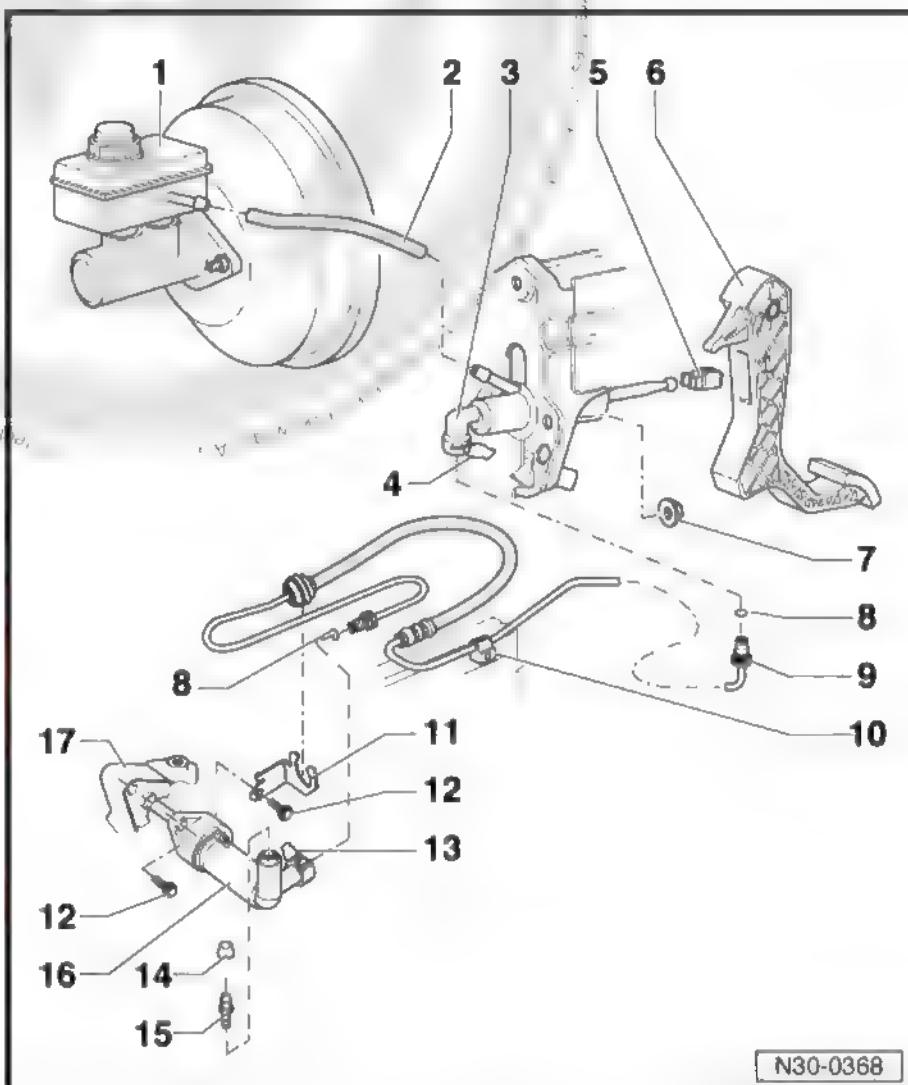
9 - Pipes and hose assembly

10 - Support

- Secured to body.
- For pipes and hose assembly.

11 - Support

- Fastened on the slave cylinder of the clutch hydraulic drive.





12 - Hexagon screw

- 20 Nm

13 - Clamp

- Push to the stop in order to remove and install the pipes and hose assembly.

14 - Protection cover

15 - Air bleeding valve

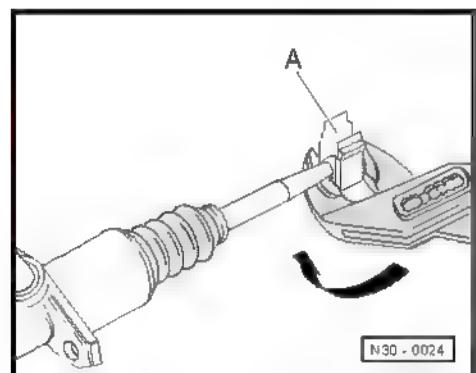
- Bleed the steering system [⇒ page 22](#).

16 - Slave cylinder - clutch hydraulic drive

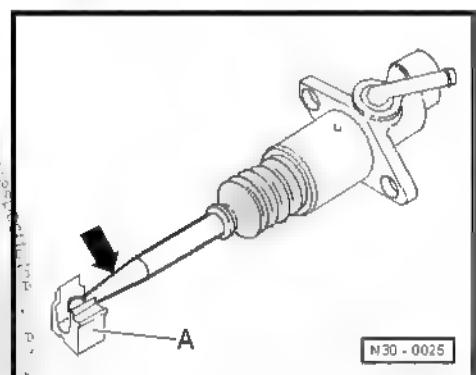
- Remove and install [⇒ page 21](#).

17 - Gearbox

Remove housing -A- by leveraging towards arrow



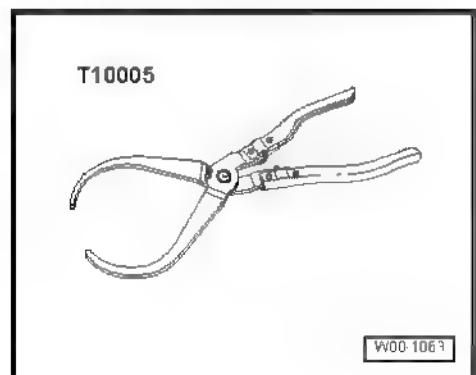
Install housing -A- on the drive stem of the transmitting cylinder of the clutch hydraulic drive, towards arrow



## 1.8 Transmitting cylinder - clutch hydraulic drive - remove and install

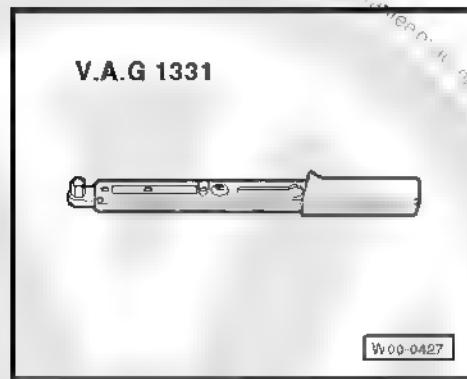
Special tools and workshop equipment required

- Pliers -T 10005-





- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-



### 1.8.1 Removal

- Disconnect the battery ⇒ Electrical equipment; Rep. Gr. 27 ;  
Battery - disconnect and connect .



#### Note

- ◆ Check whether the vehicle has a coded radio. If so, request the anti-theft code before disconnecting the Battery's earth strap.
- ◆ When the battery is reconnected, check the operation of the vehicle electrical system (radio, clock and electric door and window locks, etc.) according to the Workshop Manual and/or instructions for use.

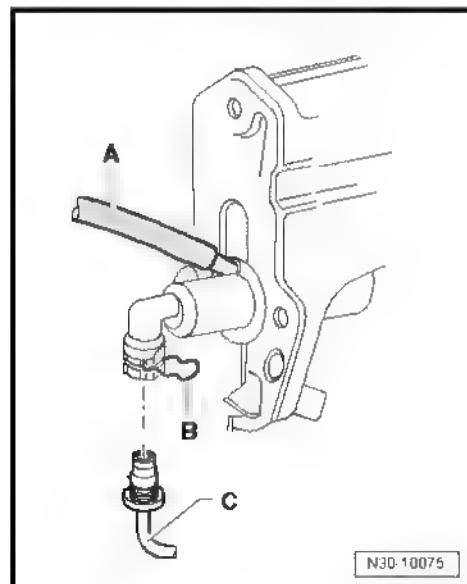
- Pull the harness carefully forwards.
- Place a lint-free cloth sufficiently large under the transmitting cylinder of the clutch hydraulic drive.
- Install Clamp (diam. 25 mm) -3094- on the return hose -A- and release it from the transmitting cylinder.



#### Note

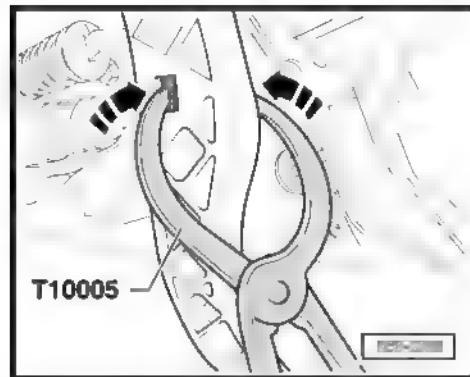
If the hose is secured with a spring clamp, release it with Standard-type or VW 5162 clamp pliers -VAS 5024A- .

- Remove clip -B- from the tubing and hose assembly on the transmitting cylinder.
- Remove tubing and hose assembly -C- from the transmitting cylinder and cover it.
- Remove the Clutch pedal switch -F36- [⇒ page 11](#)

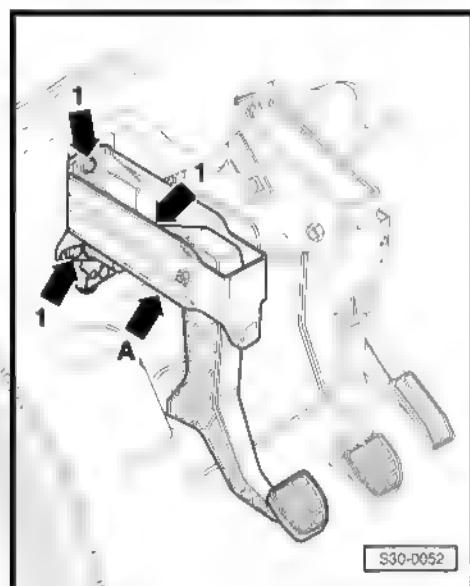




- Pull clutch pedal slightly towards front seat and press inwards both sides of the housing with Pliers -T 10005- both sides of the housing inwards -arrows-.
- Separate the transmitting cylinder stem from the clutch pedal's hydraulic drive.



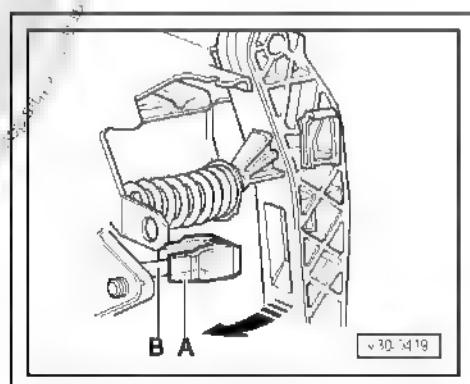
- Loosen the fastening nuts -arrow 1- from the housing support -arrow A-.
- Remove the housing support.
- Remove the cable return spring [⇒ page 12](#).
- Remove the return spring housing from the housing support.
- Release the clutch pedal stop.
- Remove the transmitting cylinder on the clutch hydraulic drive.



## 1.8.2 Installation

Install by inverting the removal sequence, paying attention to the following:

- Install cable return spring [⇒ page 12](#).
- The housing -A- shall be on the transmitting cylinder stem on the clutch hydraulic drive -B-.
- Press clutch pedal -arrow- to fit the drive stem, make sure the fitting is OK.
- Bleed the braking system after installing the impelling cylinder [⇒ page 22](#)

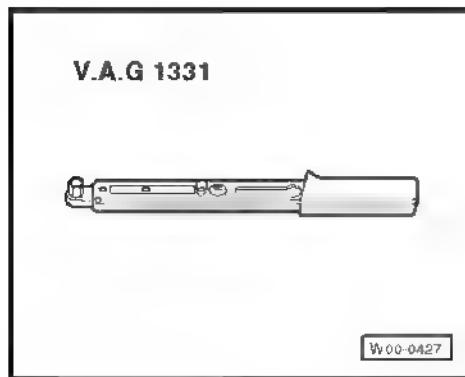


## 1.9 Clutch hydraulic drive slave cylinder - remove and install

Special tools and workshop equipment required



- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-

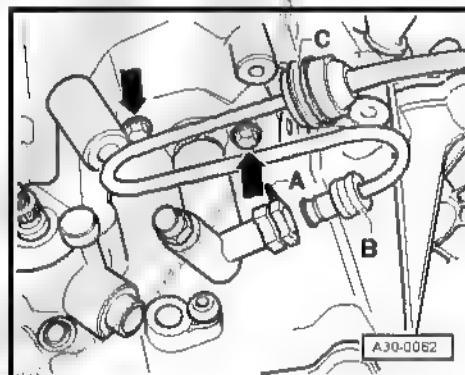


### 1.9.1 Removal

- Disconnect the Battery -A- ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .

#### Note

- ◆ Check whether the vehicle has a coded radio. If so, request the anti-theft code before disconnecting the Battery's earth strap.
- ◆ When the battery is reconnected, check the operation of the vehicle electrical system (radio, clock and electric door and window locks, etc.) according to the Workshop Manual and/or instructions for use.
- When air filter is installed behind the battery, it must also be removed ⇒ Engine; Rep. Gr. 24 ; Fuel supply - injection system .
- Place a lint-free cloth sufficiently large under the slave cylinder of the clutch hydraulic drive.
- Remove drive receptor cylinder clamp -A- , which fastens pipes and hose.
- Remove the tubing and hose assembly from the housing -C- on transmission.
- Separate the tubing and hose assembly -B- from the drive receiving cylinder and cover the open ends.
- Loosen screws on cylinder -arrows- and remove it.



### 1.9.2 Installation

Install by inverting the removal sequence, paying attention to the following:

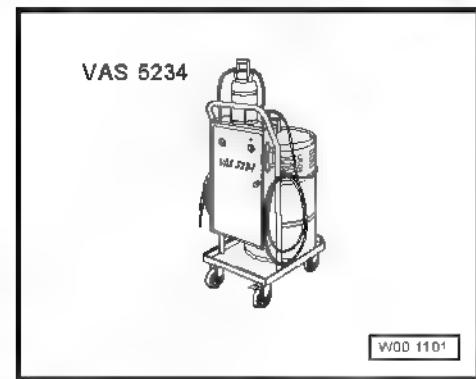
- Bleed the braking system after installing the receiving cylinder  
⇒ [page 22](#) .

### 1.10 Clutch system - bleed

Special tools and workshop equipment required

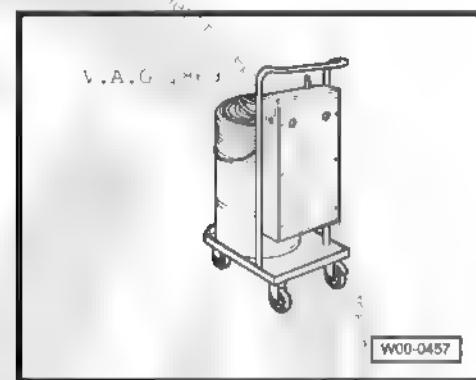


◆ Brake filling and bleeding equipment -VAS 5234-



or

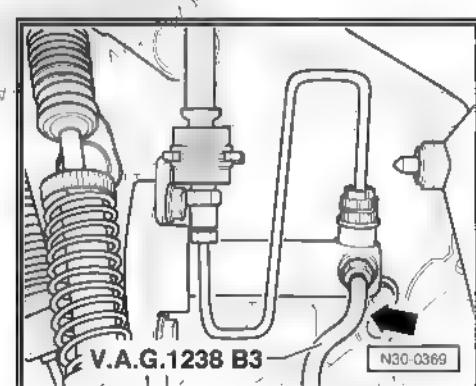
◆ Break bleeding device -V.A.G 1869-



Note

*Prefilling system is not necessary!*

- When required, use 670mm hose -1238/B3- .
- Connect the bleeding hose to the Brake filling and bleeding equipment -VAS 5234- or Break bleeding device -V.A.G 1869- .
- Install the bleeding hose on the impelling cylinder -arrow- and open the bleeding valve.
- Pressurize the system to 2 bar.
- Open the bleeding valve.
- Bleed approximately 100 cm<sup>3</sup> of brake fluid.
- Press quickly the pedal from stop to stop, 10 to 15 times.
- Let bleed additional 50 cm<sup>3</sup> of brake fluid.
- Close the bleeding valve
- Press the clutch pedal several times.





## 2 Clutch drive mechanism - repair

### 1 - Clutch roller bearing

- Remove and install with the clutch disengaging lever  
⇒ [Item 3 \(page 24\)](#) and roller bearing's guide bushing  
⇒ [Item 5 \(page 24\)](#).
- Do not wash the clutch roller bearing, only clean it with cloth.
- Change noisy roller bearings.

### 2 - Screw

- 5 Nm + 90°.
- Replace whenever removed.

### 3 - Clutch disengaging lever

- Remove and install  
⇒ [page 25](#)
- Remove and install with the clutch roller bearing  
⇒ [Item 1 \(page 24\)](#) and roller bearing's guide bushing  
⇒ [Item 5 \(page 24\)](#).
- Lubricate the stop point on the spherical pin with Lubricating grease MoS2 ⇒ Refer to Chemicals Manual .

### 4 - Lever-pressure lever

- Fasten on the clutch lever.

### 5 - Roller bearing's guide bushing

- Remove and install ⇒ [page 25](#)
- Remove and install with the clutch roller bearing ⇒ [Item 1 \(page 24\)](#) and roller bearing's disengaging lever ⇒ [Item 3 \(page 24\)](#).

### 6 - Sealing ring for primary shaft

- Replace ⇒ [page 82](#)

### 7 - Ball pin

- 20 Nm.
- Lubricate with Lubricating grease MoS2 ⇒ Refer to Chemicals Manual .

### 8 - Gearbox

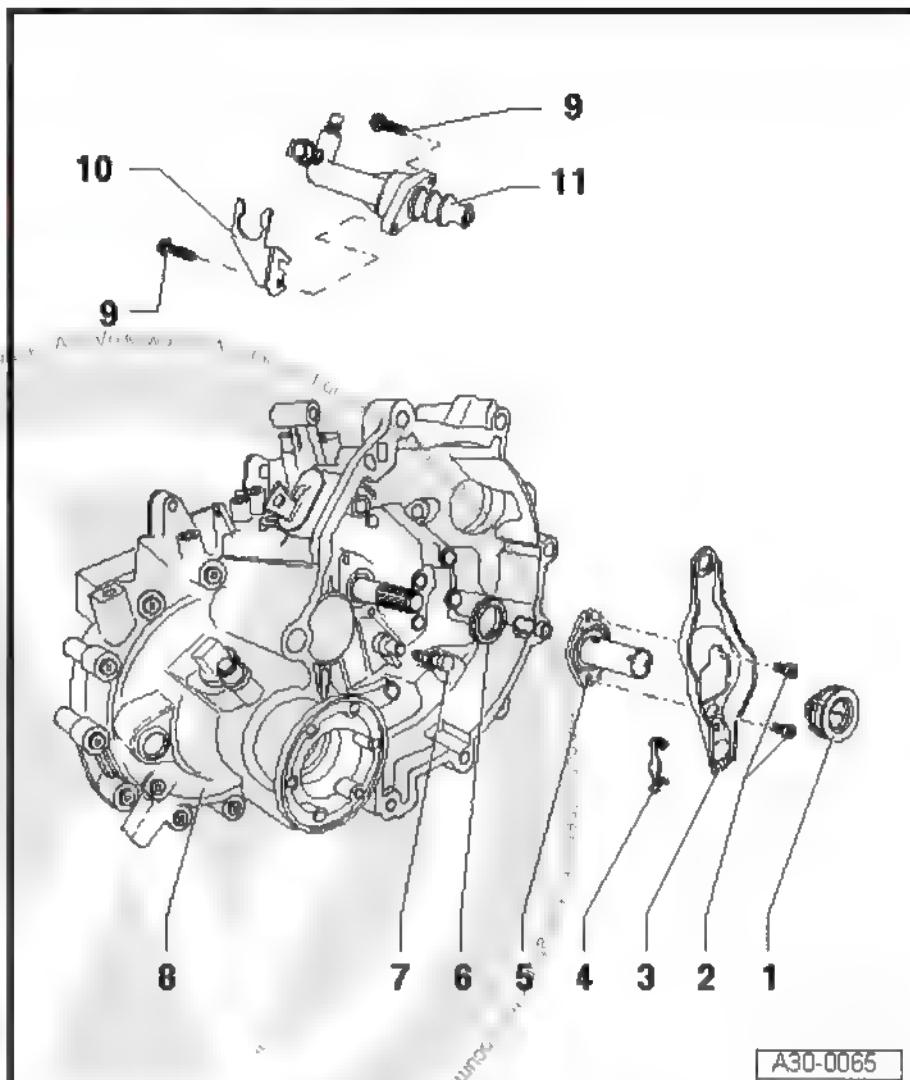
### 9 - Screw

- 20 Nm

### 10 - Support

### 11 - Slave cylinder

- Remove and install ⇒ [page 21](#).
- Lubricate the stem tip with Lubricating grease MoS2 ⇒ Refer to Chemicals Manual .

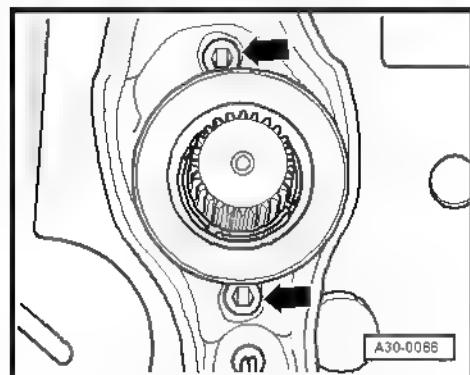




#### Removing and installing the clutch lever with the clutch bearing and bearing guide

- Loosen the screws -arrows-
- Separate clutch lever, with the clutch collar and guide bushing, from primary shaft and spherical pin

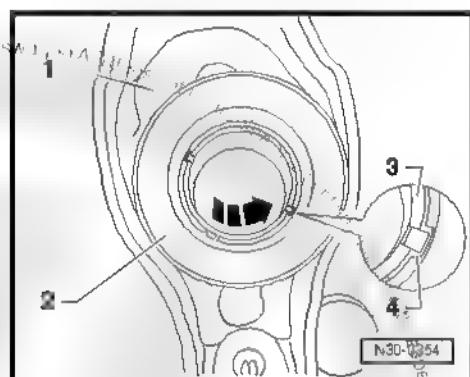
Installation is carried out in the reverse order of removal.



#### Removing and installing the bearing's guide bushing

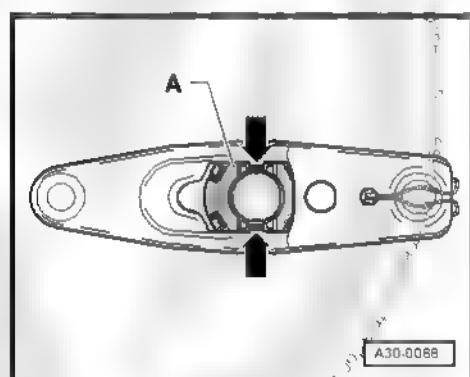
- Displace the guide bushing -3- from the clutch collar -2-, by pushing it upwards.
- While securing the collar -2-, turn guide bushing -3- 90° towards arrow, until its fitting edges match the slots -4- on collar.
- Remove guide bushing from collar.

Installation is carried out in the reverse order of removal.



#### Removing and installing clutch collar

- Compress the fitting edges -arrows- located on the rear part of the clutch lever, and pull collar -A- out of the lever.
- To install collar -A-, engage it on the clutch lever until fitting the edges -arrows- fit in.

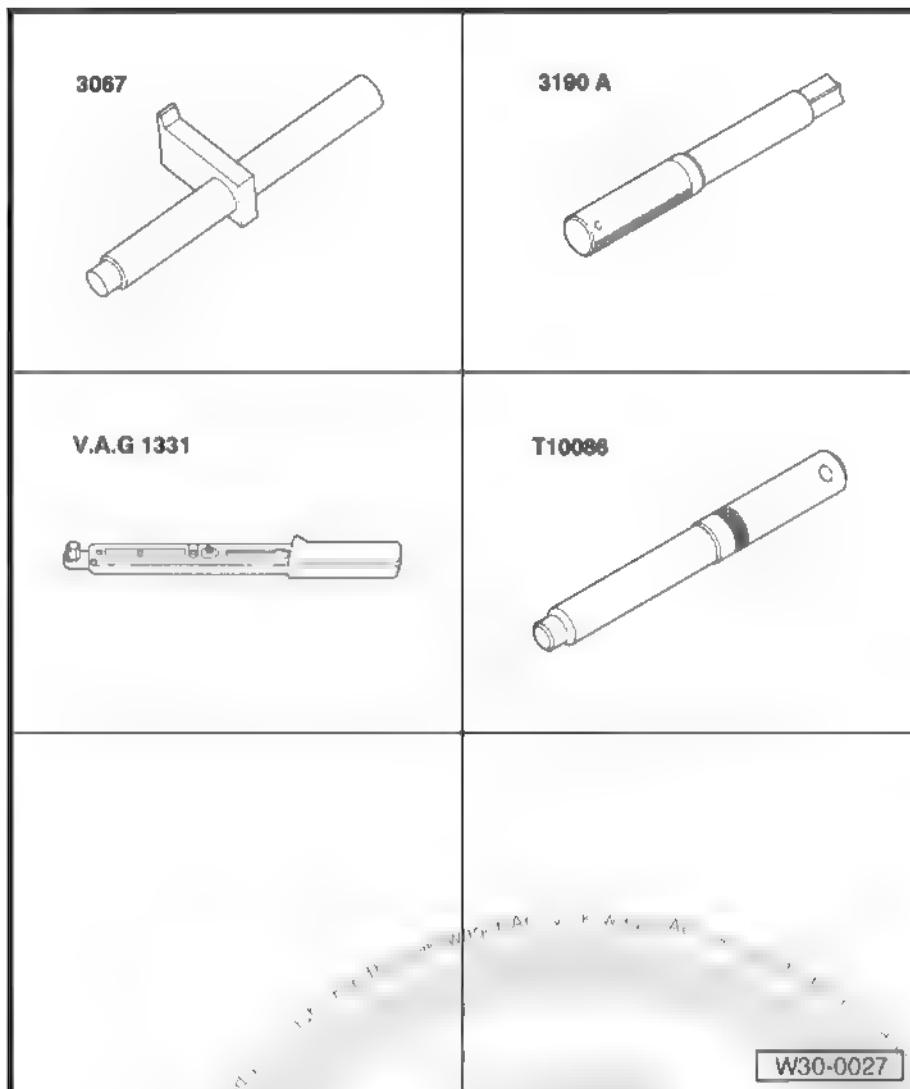




### 3 Clutch - repair

#### Special tools and workshop equipment required

- ◆ Latch -3067-
- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-
- ◆ Guide Pin -T 10086-
- ◆ Guide Pin -3190A-



#### Note

- ◆ Change clutch discs and plates with damaged or loosened riveted unions.
- ◆ The clutch disc and plate must correspond each other according to the ⇒ Electronic Parts Catalogue (ETKA) and the engine prefixes.



### 1 - Flywheel

- Pay attention to the perfect fitting of the guide pins
- The contact surface of the clutch disc shall be free of oil and grease, and should not have grooves
- Remove and install ⇒ Engine; Rep. Gr. 13 ; Crankshaft flanges and flywheel - remove and install .

### 2 - Clutch disc

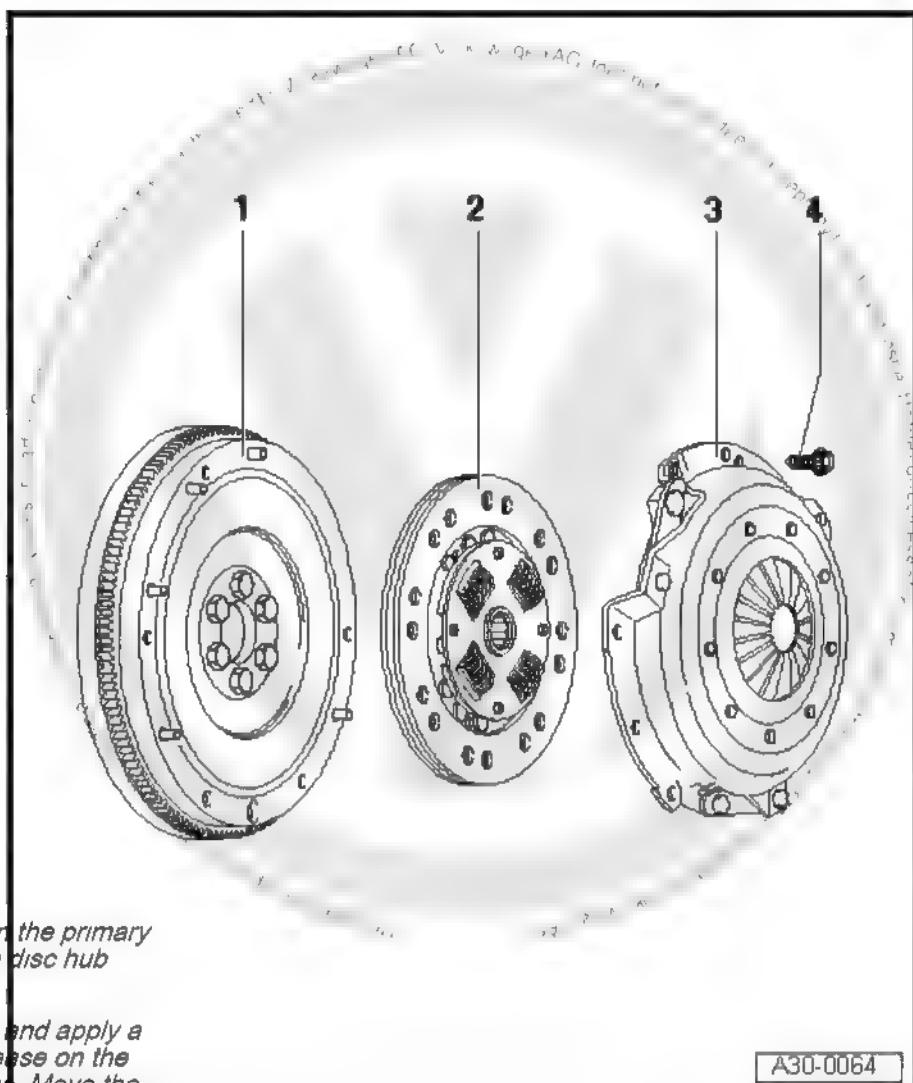
- Installation position: The spring box shall stay opposite to the clutch pressure plate
- Centering for gasoline engine vehicles  
⇒ page 28
- Centering for diesel engine vehicles  
⇒ page 28
- Apply a slight coat of grease on the splines.



#### Note

- ◆ Clean the splines on the primary shaft and the clutch disc hub used.
- ◆ Eliminate corrosion and apply a very fine coat of grease on the primary shaft splines. Move the clutch disc on the primary shaft to one side and other until the hub slides smoothly on the shaft. Eliminate excess grease. Refer to the ⇒ Chemical Materials Manual .

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### 3 - Clutch plate

- Remove and install on vehicles with petrol engine ⇒ page 28
- Remove and install on vehicles with petrol engine ⇒ page 28
- Check membrane spring height ⇒ page 28



#### Note

The clutch plates are greased and protected against corrosion. Clean the contact surface only; otherwise, the clutch lifetime will be significantly reduced

### 4 - Screw

- 20 Nm
- Loosen and tighten in a cross and phased pattern.

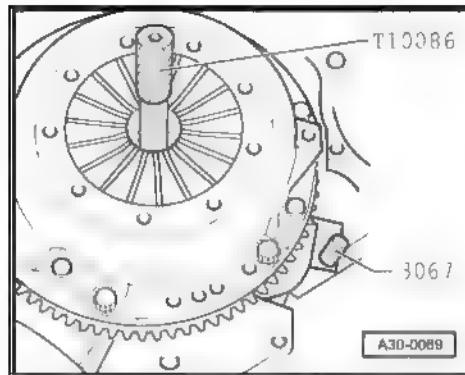


Center the clutch disc using the Guide Pin -3190A- and remove and install clutch disk - gasoline engine vehicles

- Loosen and tighten screws in a cross and phased pattern.
- To remove, install Latch -3067- .

Note

- ◆ *The clutch plate and clutch disc contact surfaces must be completely seated on the engine's flywheel.*
- ◆ *Tighten evenly the fastening screws, in a cross pattern, to prevent damages on the membrane spring of the clutch plate and the guide pins of the engine's flywheel.*



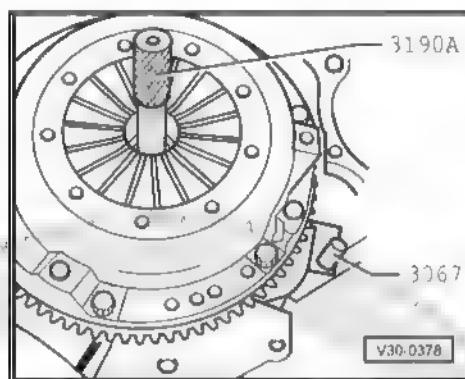
Vehicles with diesel engine

Center the clutch disc using the Guide Pin -3190A- and remove and install the clutch plate - vehicles with diesel engine

- Loosen and tighten screws in a cross and phased pattern.
- To remove, install Latch -3067- .

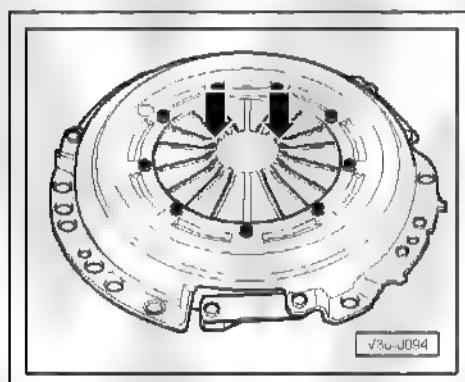
Note

- ◆ *The clutch plate and clutch disc contact surfaces must be completely seated on the engine's flywheel.*
- ◆ *Tighten evenly the fastening screws, in a cross pattern, to prevent damages on the membrane spring of the clutch plate and the guide pins of the engine's flywheel.*

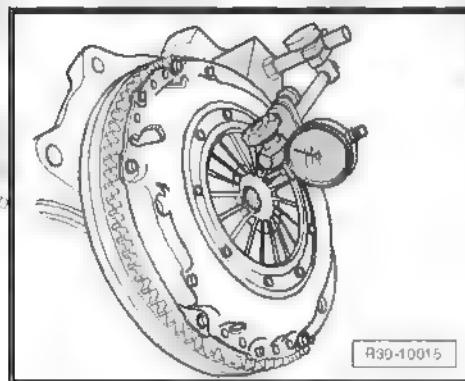


Measuring the height of the membrane spring

- Wear up to the half of the thickness of the diaphragm spring is allowed.
- Install the clutch  $\Rightarrow$  [Item 3 \(page 27\)](#) .



- Fasten centesimal dial gauge support somewhere on the engine block.
- Reset centesimal dial gauge to zero in one of the clutch plate membrane spring tabs.
- Measure height of each tab and write down the values.
- Consider the highest and lowest values found.
- The sum of obtained values on the right and left of the zero point at the centesimal dial gauge should not be higher than 0.80 mm. Otherwise, replace it.





## 34 – Drive, housing

### 1 Shift mechanism

#### 1.1 Shift mechanism - Installation position

##### 1.1.1 Shift mechanism (version 1) - Installation position

A - Gear selector cable

B - Track selector cable

C - Heat deflector

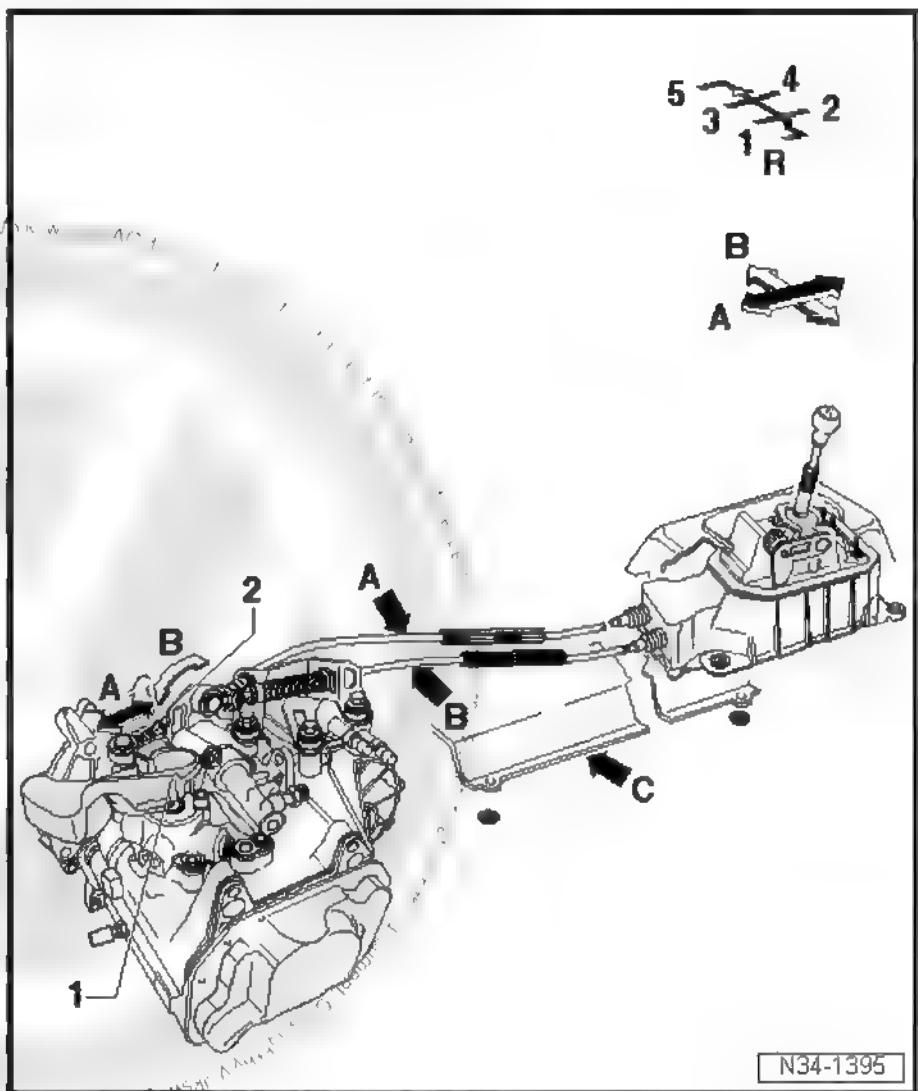
It should be removed  
before removing the  
shift mechanism

Motion arrow A - Gear engag-  
ing motion

Motion arrow B - Track selec-  
tion motion

1 - Transmission selector lever

2 - Inversion lever





I - Drive cables

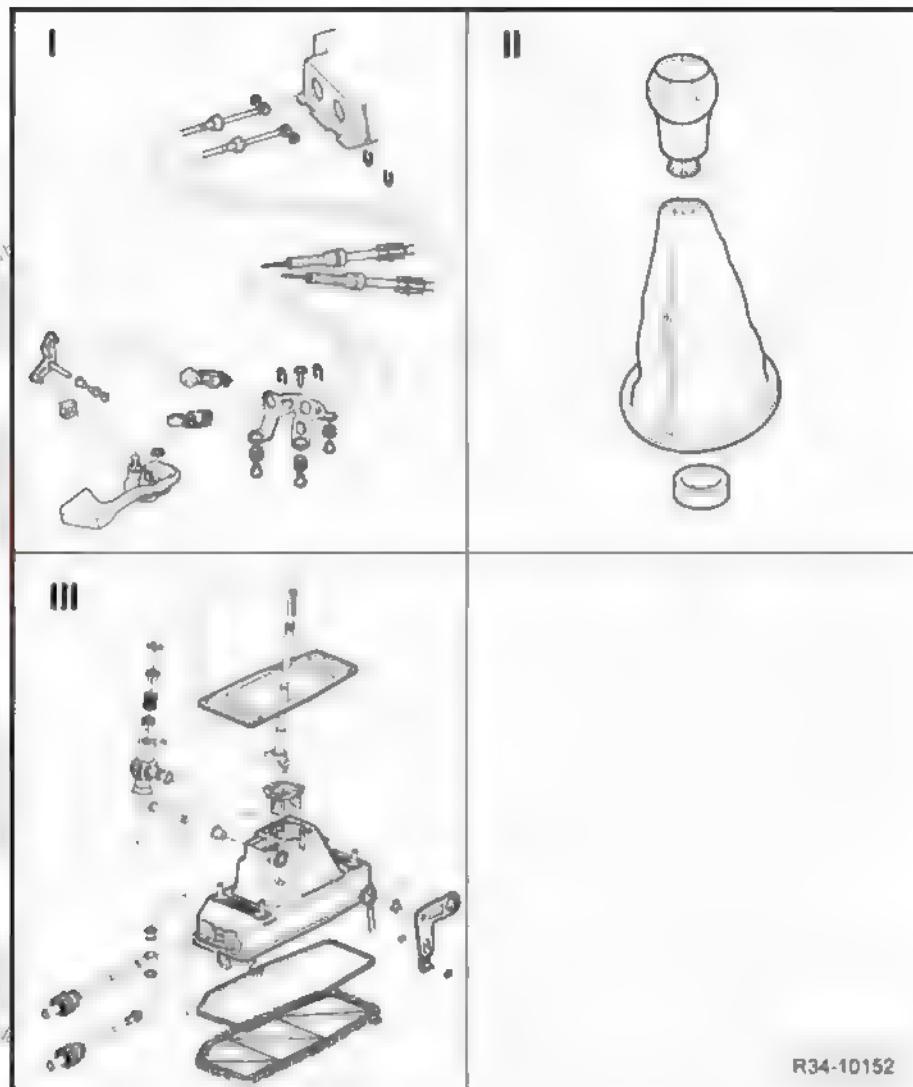
- Remove and install  
⇒ [page 32](#).

II - Gearshift lever handle and bellows

- Assembly overview  
⇒ [page 36](#).
- Remove and install  
⇒ [page 37](#).

III - Gearshift lever and mechanism

- Repair ⇒ [page 39](#).





### 1.1.2 Shift mechanism (version 2) - Installation position

A - Gear selector cable

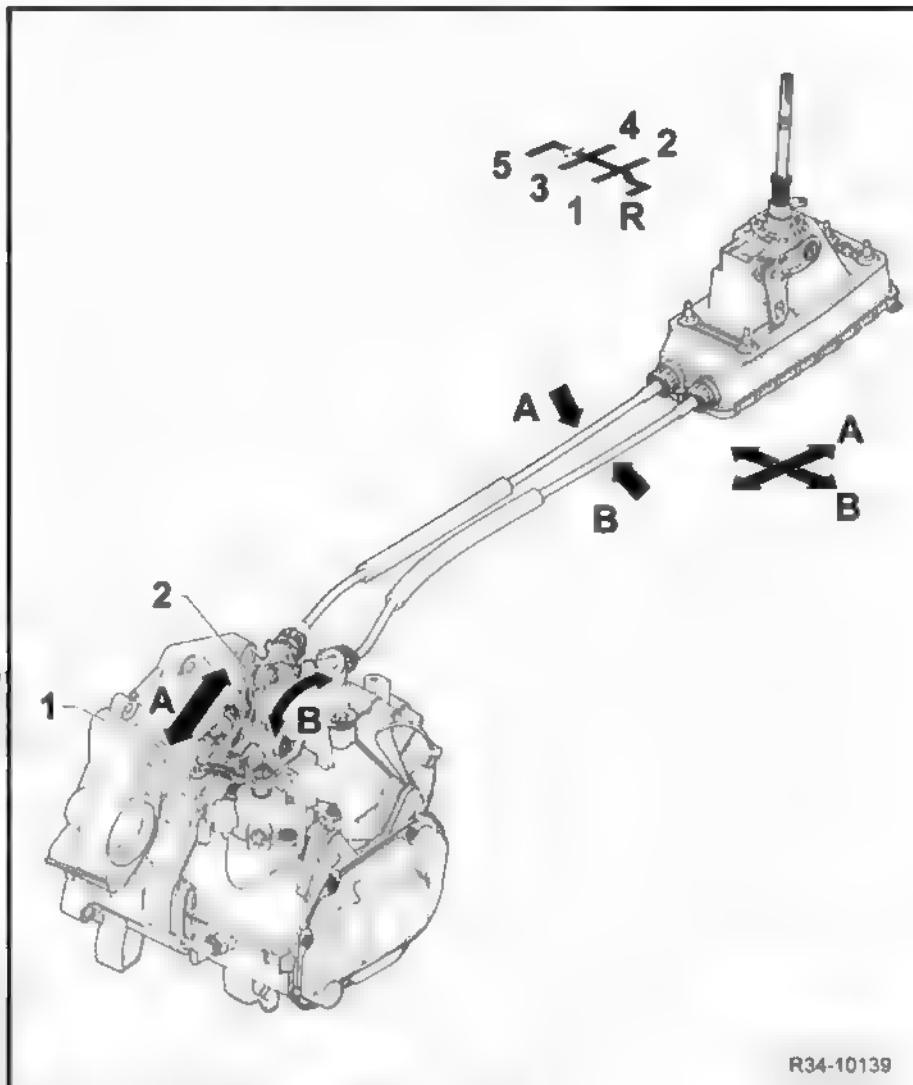
B - Track selector cable

Motion arrow A - Gear engaging motion

Motion arrow B - Track selection motion

1 - Transmission selector lever

2 - Inversion lever



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I - Drive cables

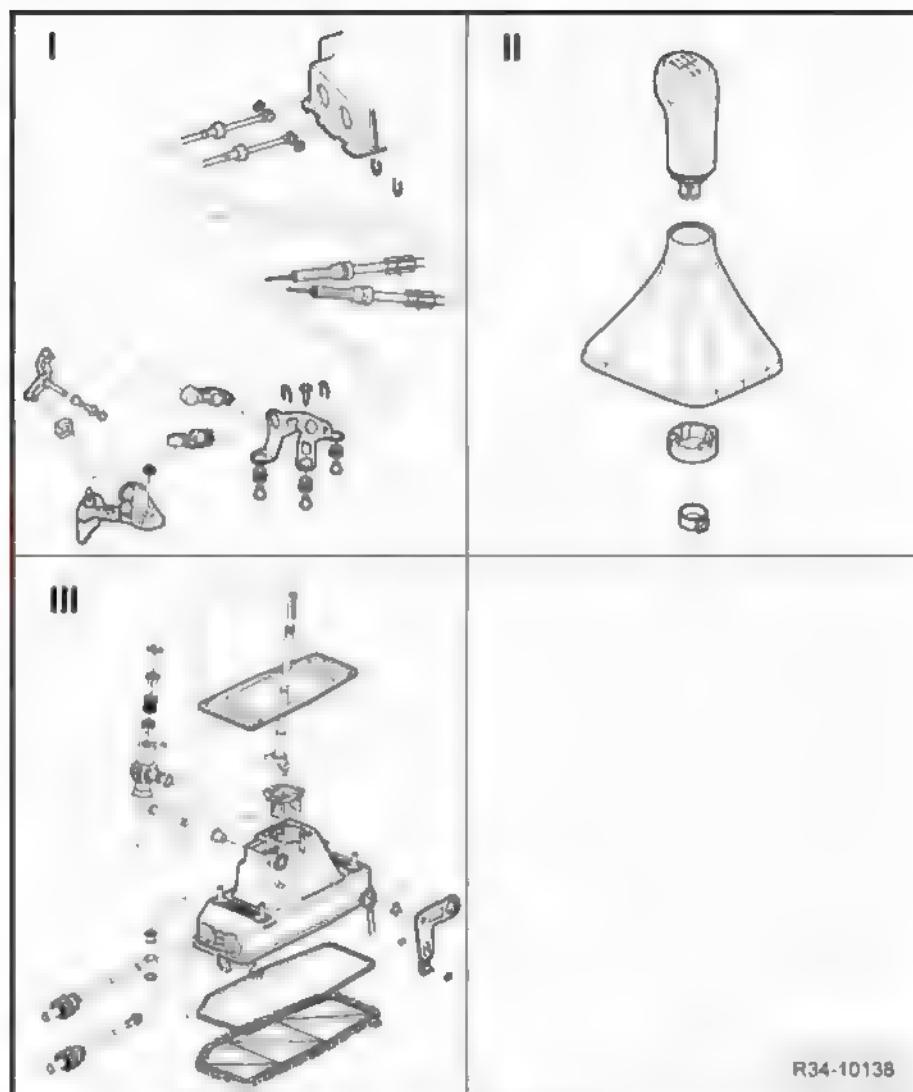
- Remove and install  
⇒ [page 34](#).

II - Gearshift lever handle and bellows

- Assembly overview  
⇒ [page 37](#).
- Remove and install  
⇒ [page 37](#).

III - Gearshift lever and mechanism

- Repair ⇒ [page 39](#).



## 1.2 I - Drive cables

### 1.2.1 Drive cables (version 1) - remove and install



Note

*Lubricate supporting points and sliding surfaces with Grease -G 052 142 A2-. Refer to the ⇒ Chemical material manual*



**1 - Gear selector cable**

- Press on the gearshift lever guide
- Installation position → [page 34](#)
- For replacement it is necessary to remove the gearshift mechanism case → [page 41](#)

**2 - Track selector cable**

- Connected on the command selector
- Installation position → [page 34](#)
- For replacement it is necessary to remove the gearshift mechanism case → [page 41](#)

**3 - Circlip**

**4 - Circlip**

- Pay attention to prevent damages on cables during removal

**5 - Gearshift mechanism case**

- Remove and install → [page 41](#)

**6 - Fastening support**

**7 - Housing bushing**

**8 - Spacer**

**9 - Screw**

- $20 \pm 2 \text{ Nm}$
- For fastening support

**10 - Selector cable fastening**

- To fasten the gear selector cable to the transmission selector lever
- Replace whenever it is removed from the transmission selector lever

**11 - Selector cable fastening**

- To fasten the gear selector cable to the transmission selector lever
- Replace whenever it is removed from the transmission selector lever

**12 - Safety washer**

**13 - Bearing bushing**

**14 - Inversion lever**

- Installation position → [page 34](#)

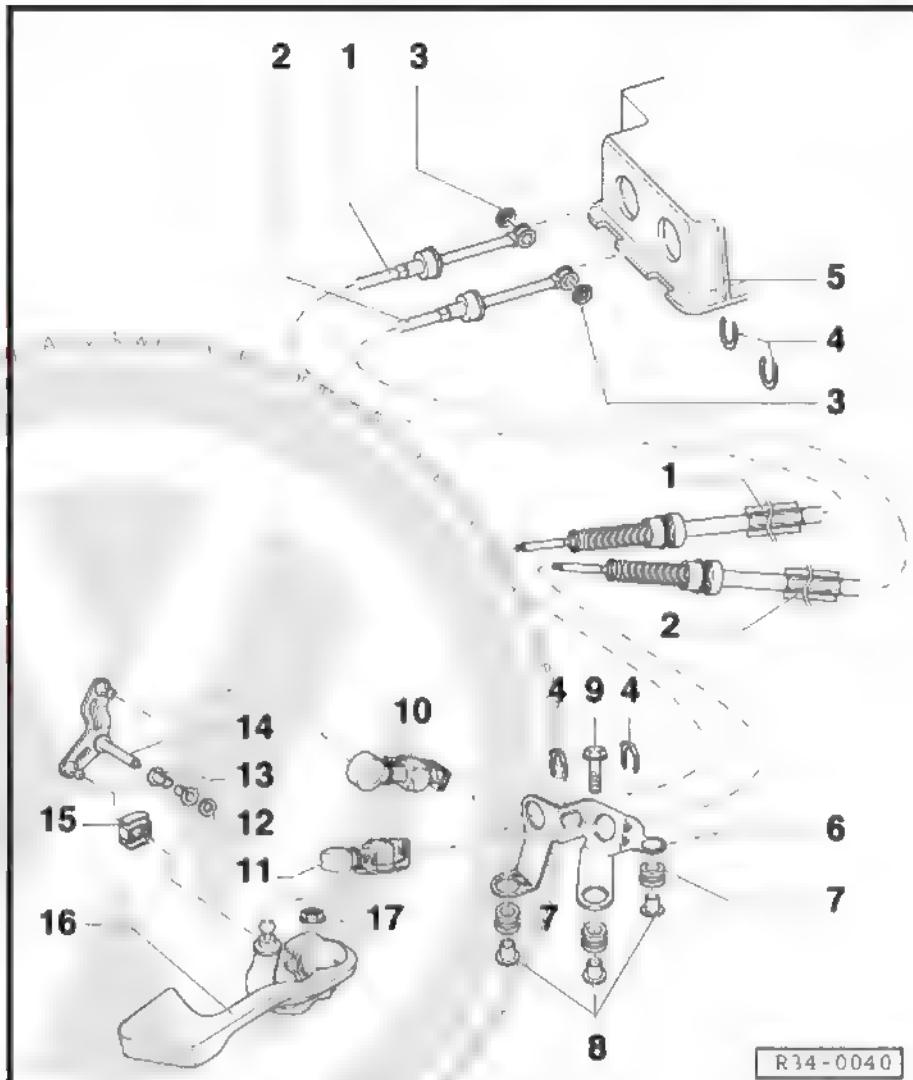
**15 - Guide shoe**

**16 - Transmission selector lever**

- With counterweight
- Installation position → [page 34](#)
- Install in order that the interrupted teeth division fits on the selector lever shaft
- After installation, adjust the gear selection mechanism → [page 43](#)

**17 - Hexagon nut**

- Self-locking

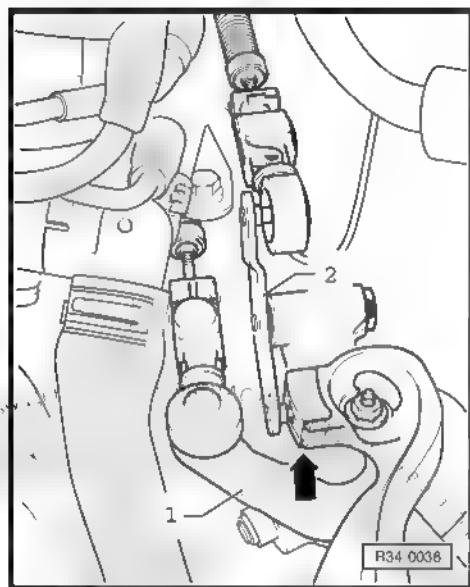




- 20 ± 2 Nm
- Replace whenever removed

Installation position of the transmission selector lever/inversion lever

- 1 - Transmission selector lever with counterweight
- 2 - Inversion lever Installed on the transmission selector lever guide by a shoe -arrow-.



### 1.2.2 Drive cables (version 2) - remove and install



#### Note

Lubricate supporting points and sliding surfaces with Grease -G 052 142 A2-. Refer to the ⇒ Chemical material manual



**1 - Gear selector cable**

- Press on the gearshift lever guide
- Installation position [page 36](#)
- for replacement it is necessary to remove the gearshift mechanism case [page 41](#)

**2 - Track selector cable**

- Connected on the command selector
- Installation position [page 36](#)
- for replacement it is necessary to remove the gearshift mechanism case [page 41](#)

**3 - Circlip**

**4 - Circlip**

- Pay attention to prevent damages on cables during removal

**5 - Gearshift mechanism case**

- remove and install [page 41](#)

**6 - Fastening support**

**7 - Housing bushing**

**8 - Spacer**

**9 - Screw**

- $20 \pm 2 \text{ Nm}$
- For fastening support

**10 - Selector cable fastening**

- To fasten the gear selector cable to the transmission selector lever
- Replace whenever it is removed from the transmission selector lever

**11 - Selector cable fastening**

- To fasten the gear selector cable to the transmission selector lever
- Replace whenever it is removed from the transmission selector lever

**12 - Safety washer**

**13 - Bearing bushing**

**14 - Inversion lever**

- Installation position [page 36](#).

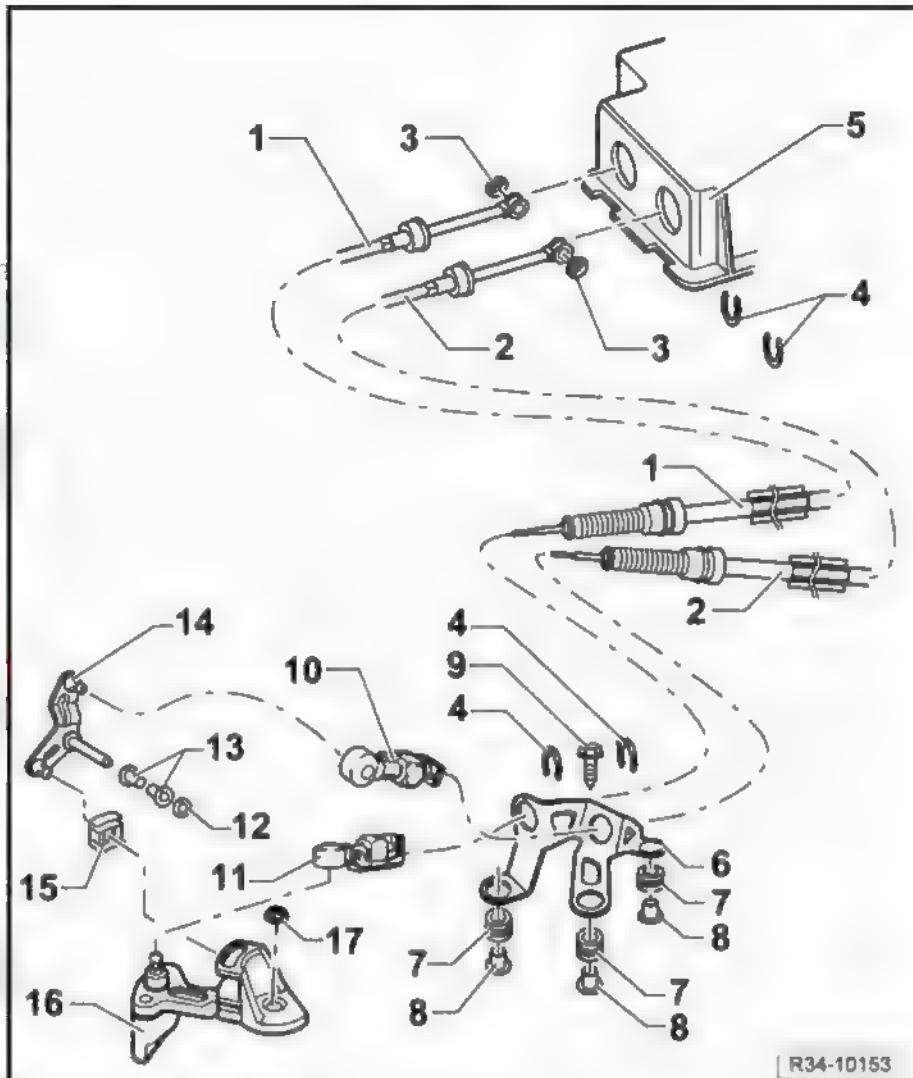
**15 - Guide shoe**

**16 - Transmission selector lever**

- With counterweight
- Installation position [page 36](#)
- Install in order that the interrupted teeth division fits on the selector lever shaft
- After installation, adjust the gear selection mechanism [page 43](#)

**17 - Hexagon nut**

- Self-locking



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- 20 ± 2 Nm
- Replace whenever removed

Installation position of the transmission selector lever/inversion lever

- 1 - Transmission selector lever with counterweight.
- 2 - Inversion lever Installed on the transmission selector lever guide by a shoe -arrow-.



## 1.3 II - Handle and bellows on the gearshift lever - assembly overview

### 1.3.1 Handle and bellows on the gearshift lever (version 1) - assembly overview

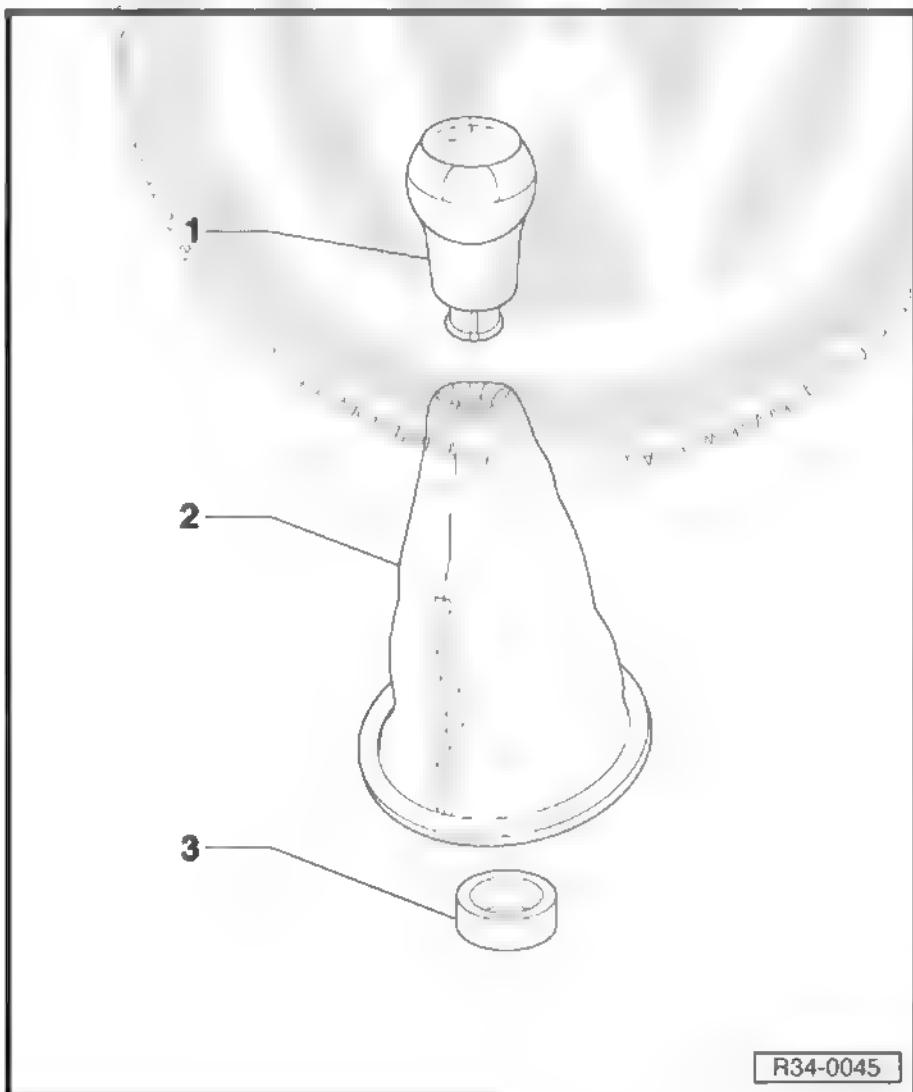
#### 1 - Gearshift lever handle

- Remove and install with bellows

#### 2 - Caul with frame

- Remove and install with the gearshift lever handle
- Disassemble gearshift lever handle, removing the bushing

#### 3 - Bushing





### 1.3.2 Handle and bellows on the gearshift lever (version 2) - assembly overview

#### 1 - Gearshift lever handle

- Remove and install with bellows → [page 37](#)

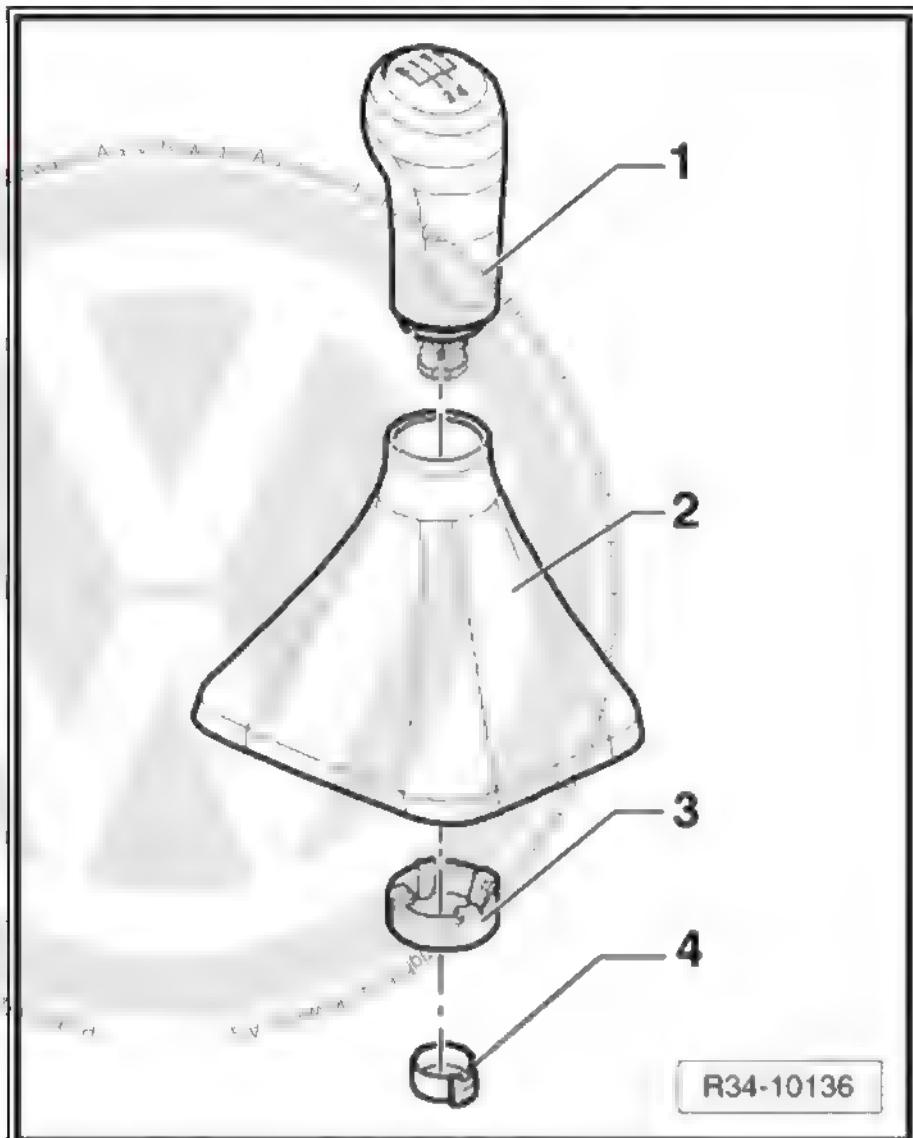
#### 2 - Caul with frame

- Remove and install with the gearshift lever handle → [page 38](#)
- Disassemble gearshift lever handle, removing the bushing

#### 3 - Bushing

#### 4 - Clamp

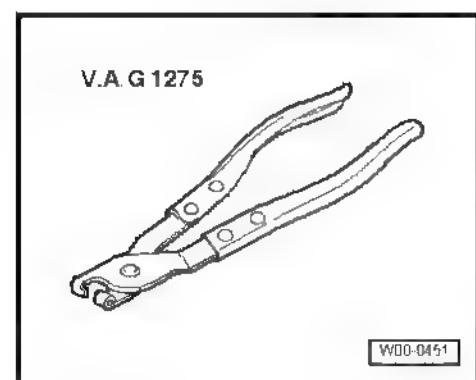
- To fasten handle to gearshift lever
- Replace whenever removed
- Fasten with Clamp pliers or VW 004V -VAG 1275- to gearshift lever handle



### 1.4 Handle and bellows on the gearshift lever - remove and install

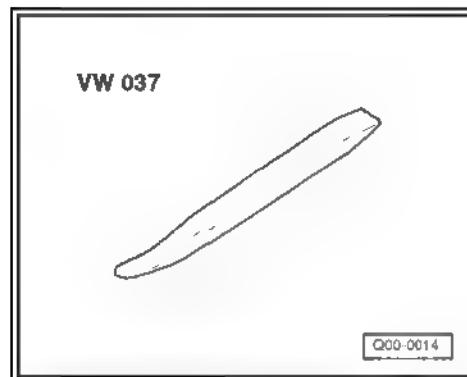
Special tools and workshop equipment required

- ◆ Clamp pliers or VW 004V -VAG 1275-



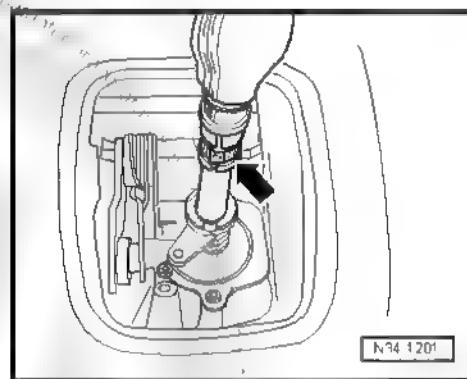


◆ Spatula -VW 037-



#### 1.4.1 Removal

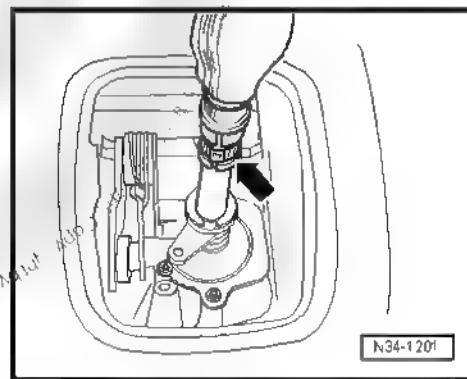
- Carefully disengage caul from central console using the Spatula -VW 037- .
- Turn caul backwards on top of gearshift lever handle.
- Remove packing, if any.
- Loosen clamp -arrow- and remove gearshift lever handle along with caul.



#### 1.4.2 Installation

- Turn caul lower section outwards.
- Assemble gearshift lever handle and caul and put a new clamp -arrow-.

When assembling, handle must fit the gearshift lever groove.



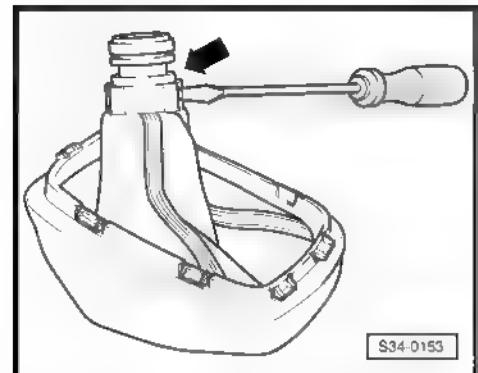
#### 1.5 Handle and caul on the gearshift lever - disassemble and assemble

##### 1.5.1 Disassembly

- Turn cover internal side outwards

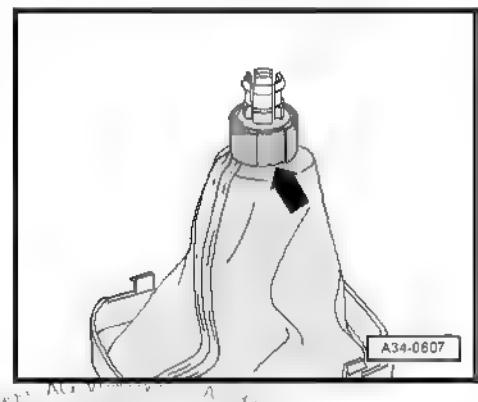


- With a screwdriver, carefully force tightening bushing -arrow- and simultaneously pull gearshift lever handle out.



#### Note

*For some components, screwdriver must be used between packing and bushing where indicated by the -arrow-.*



### 1.5.2 Assembly

- Install gearshift lever handle on caul.
- Press tightening bushing on handle and fit.

### 1.6 III - Gearshift lever and mechanism - repair



#### Note

*Lubricate supporting points and sliding surfaces with Grease -G 000 450 02-. Refer to the ⇒ Chemical Materials Manual .*



1 - Gasket

- Self-adhesive
- Install on the gearshift mechanism case
- Replace whenever removed

2 - Gear shifter

3 - Spherical ball joint

4 - Gearshift mechanism case

- Remove and install  
⇒ [page 41](#)

5 - Return spring

6 - Bushing

7 - Insulation

8 - Command selector arm

9 - Circlip

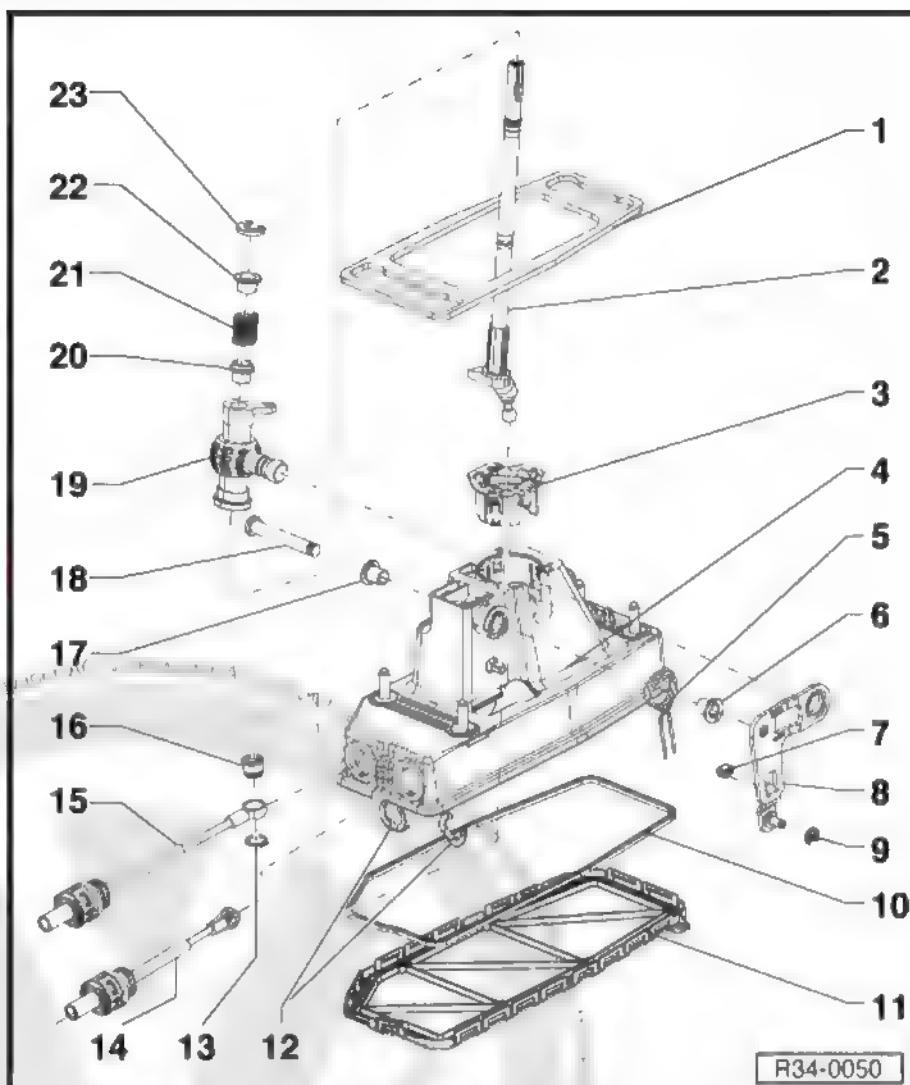
- Replace whenever removed

10 - Silicone rubber

- Apply  $12 \pm 2$  g
- Sealing putty -D 176 404 A2s. Refer to the ⇒ Chemical Materials Manual

11 - Seat plate

- To remove, open locks
- Replace whenever re-





moved

#### 12 - Gearshift lever support

- Replace whenever removed

#### 13 - Circlip

- Replace whenever removed

#### 14 - Gear selector cable

- Installation position (version 1) ➤ [page 34](#)
- Installation position (version 2) ➤ [page 36](#)
- for replacement it is necessary to remove the gearshift mechanism case ➤ [page 41](#)

#### 15 - Track selector cable

- Installation position (version 1) ➤ [page 34](#)
- Installation position (version 2) ➤ [page 36](#)
- for replacement it is necessary to remove the gearshift mechanism case ➤ [page 41](#)

#### 16 - Bushing

- Replace whenever removed

#### 17 - Bushing

#### 18 - Support pin

#### 19 - Gearshift lever guide

#### 20 - Lower bushing

#### 21 - Gearshift lever spring

#### 22 - Upper bushing

#### 23 - Gearshift lever circlip

## 1.7 Gearshift mechanism - remove and install

### 1.7.1 Removal

- Disconnect and remove the Battery -A- ➤ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .



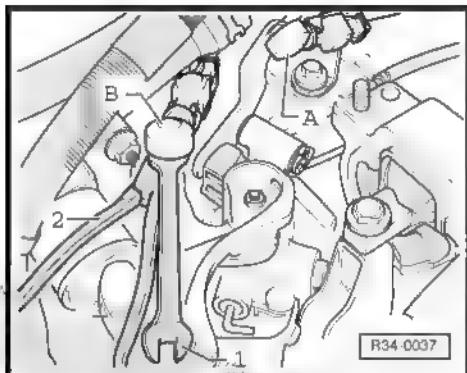
#### Note

- ◆ Check whether the vehicle has a coded radio. If so, request the anti-theft code before disconnecting the Battery's earth strap Battery -A- .
- ◆ When the Battery -A- , check the vehicle's equipment (radio, clock, electric door locks, power windows, etc.) according to the repair manual and/or instructions for use.
- Remove the console for the Battery -A- ➤ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .

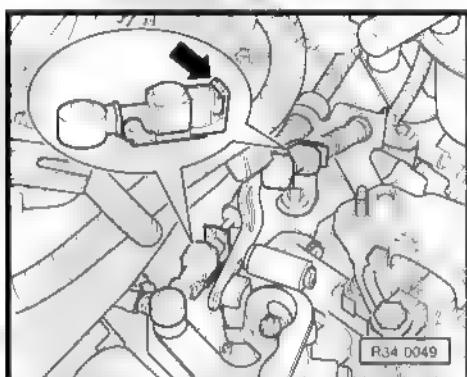


- The fastening elements -A- or -B- must be disengaged by using an open-mouth wrench -1-, only to replace the gear selection cable, track selector cable or fastening element.
- Install a second open-mouth wrench or suitable pliers -2- under it.

If the replacement of the components mentioned above is not required:



- Release the fasteners by unlocking their respective locks -arrow-.

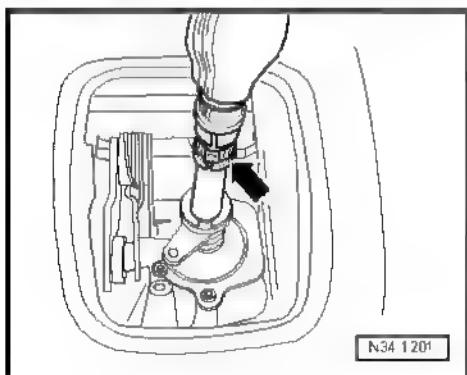
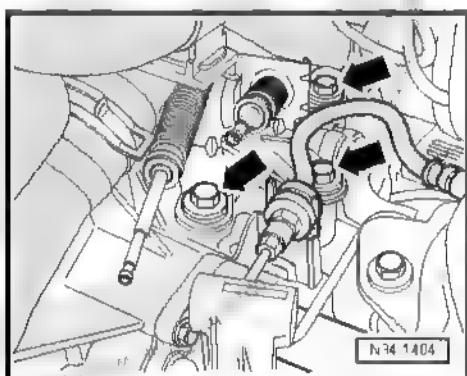


- Remove the fastening support of the transmission cable -arrows-.



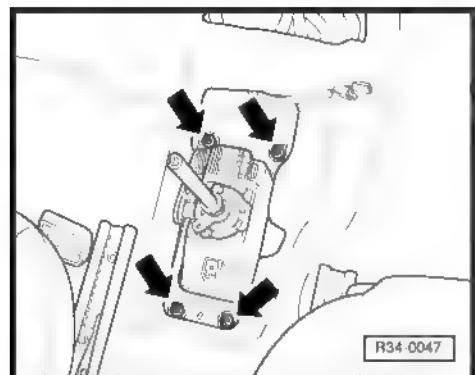
For better comprehension, the selector lever, inversion lever and cable fastening elements are not represented.

- Carefully remove the bellows from the central console  
[⇒ page 37](#).
- Loosen clamp -arrow- and pull gearshift lever handle out along with caul.
- Remove the centre console ⇒ Body - internal mountings; Rep. Gr. 68 ; Internal equipment .





- Remove the nuts -arrows- nuts from the gearshift mechanism housing case
- Remove the engine/transmission crankcase protector, if it exists.
- Remove cross member under the exhaust system.
- Separate the exhaust system from the double clamp and lower it ➔ Engine; Rep. Gr. 26 ; Exhaust system .
- Release the front heat deflector from the rear one.
- Remove the gearshift mechanism case downwards together with the drive cables



### 1.7.2 Installation

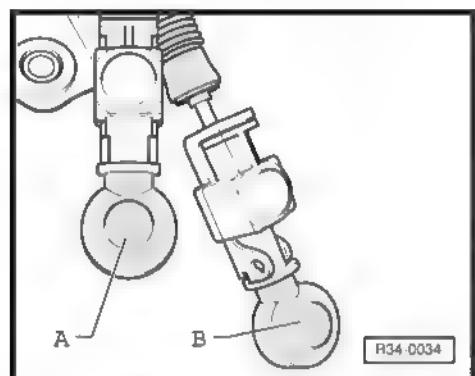
Install by inverting the removal sequence, paying attention to the following:

- Apply a light coat of grease Grease -G 052 142 A2- on the caps of the new fastening elements -A- and -B-. Refer to the ➔ Chemical material manual .



#### Note

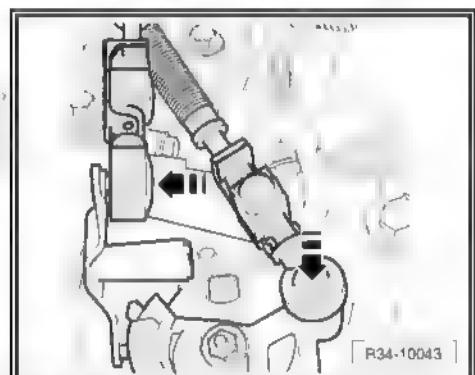
*The external sealing lips -arrows- shall be free of grease.*



- Press gearshift selector cable on the transmission selector lever, and the track selector cable on the inversion lever -arrows-.

If the selector cable fastening has not been removed:

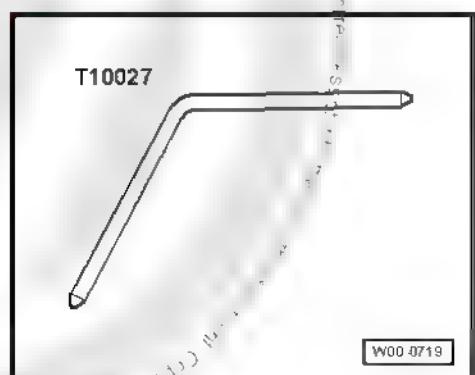
- Connect the gear selector cable and the command selector cable with respective fixtures.
- Adjust the gearshift mechanism ➔ [page 43](#) .



### 1.8 Gear selection mechanism - adjust

Special tools and workshop equipment required

- ◆ Wrench -T10027A-





## 1.8.1 Gear selection mechanism - adjust

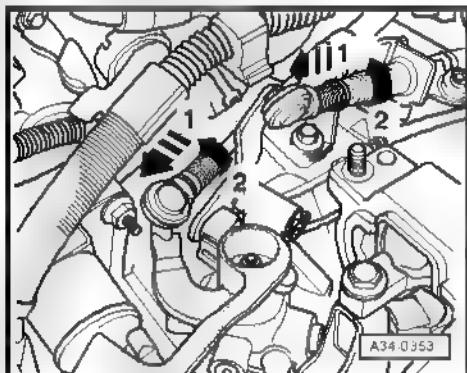
Check conditions:

- Transmission in "idle"
- Gearshift lever and cables in perfect conditions.
- Good operation when engaging gears
- Transmission, clutch and drive mechanism in perfect conditions

Unlock the fastening elements of the drive cables:

- Remove fasteners by removing them from cables in direction of -arrow 1- until buffer and lock them by turning left in direction of -arrow 2-

or depending on the type of fastener

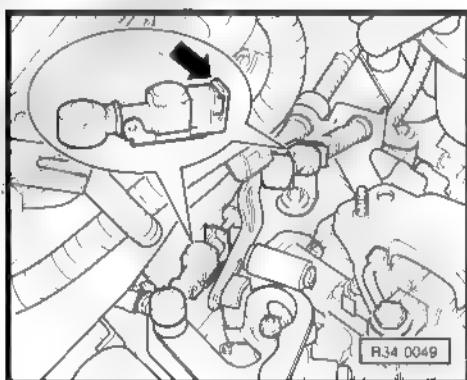


- Release the fasteners by unlocking their respective locks -arrow-.

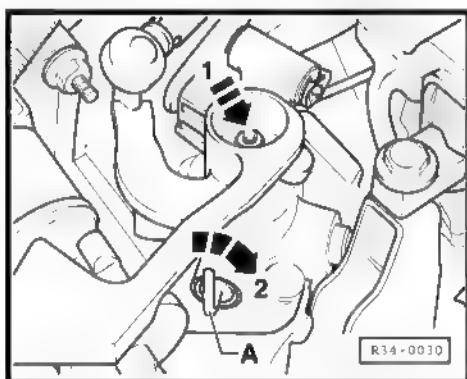


*Command cable must move on the cable fastening element.*

Lock selector lever:



- Press transmission selector lever downwards towards -arrow 1- in 1<sup>st</sup>, and 2<sup>nd</sup>, gear, and turn the safety pin -A- by approximately 90° towards -arrow 2-.

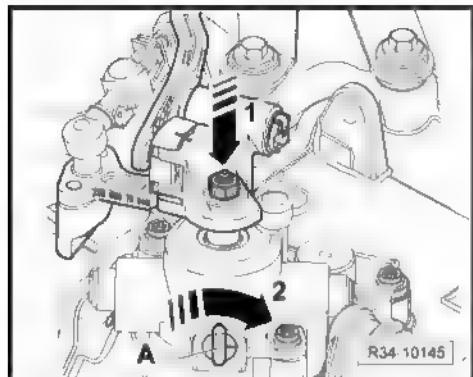




or

**Lock gearshift lever:**

- Remove the gearshift lever caul from central console.
- Move the gearshift lever slowly to the left in the track 1<sup>nd</sup>. and 2<sup>nd</sup> gears.

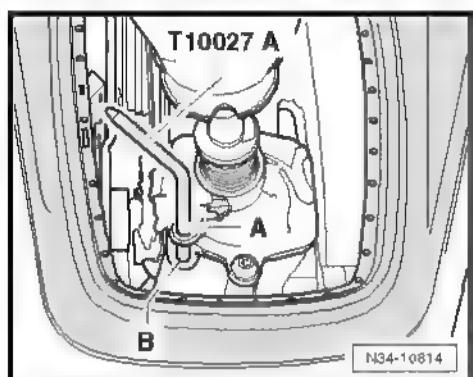


- Insert the Wrench -T10027A- in hole -B- through hole -A-.



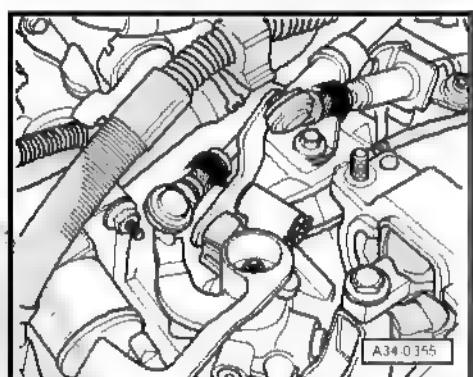
*Check that the selector lever command and the command cable are mounted without tension on the cable fastening element.*

- Turn to right, to the stop, the gear and track selector cables' safety mechanism, towards -arrow-.

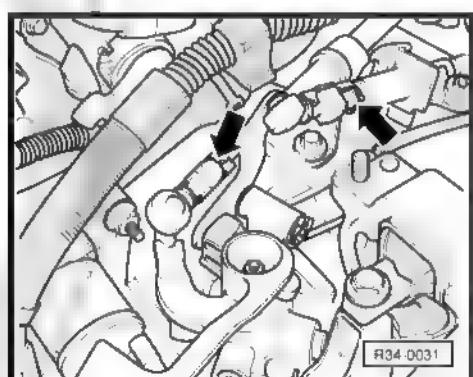


The spring returns the safety mechanism to initial position.

or depending on the type of fastener

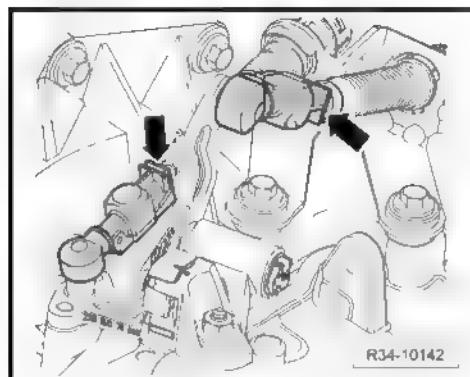


- Move the gear and track selector cables' safety mechanism until locking them -arrow-.

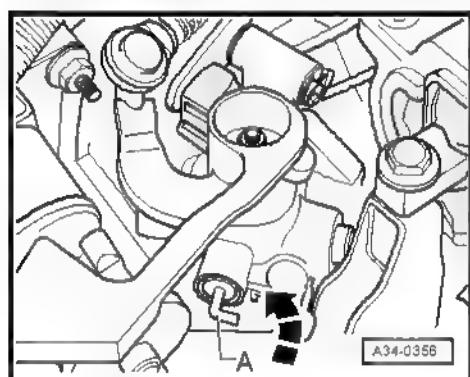




or

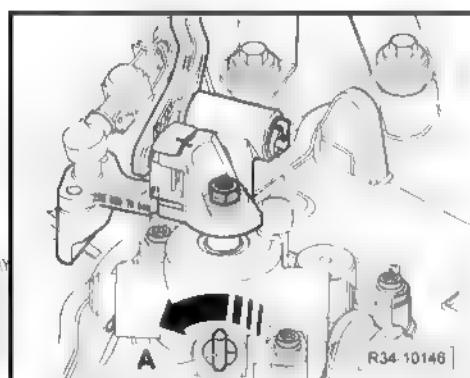


- Turn safety pin -A- in the direction of -arrow-, in order to return to its initial position.

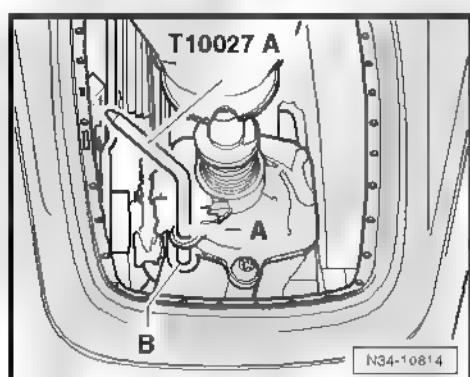


or

- Dowel pin -A- must be in a vertical position.



- Remove the Wrench -T10027A- from holes -A- and -B-.
- Install the removed components.



## 1.8.2 Gear selection mechanism - check operation

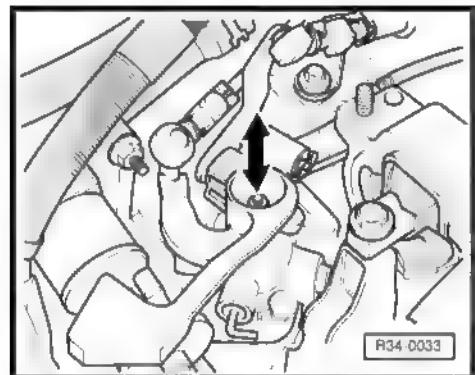
- Gearshift lever shall be in the "idle" position, in 3rd./4nd- gear wheel.
- Activate clutch.



- Engage all gears several times. Make sure especially that the reverse gear blocking is operating correctly.

When a gear is engaged repetitively and a problem still persists, check clearance (travel) of the transmission selector lever, as follows:

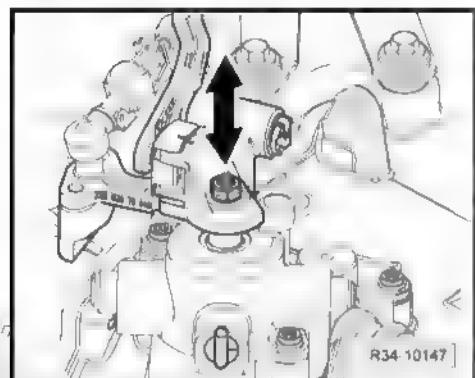
- Engage the 1<sup>nd</sup>. gear wheel.
- Move gearshift lever to the left, to the stop, and release it.
- At same time, check the transmission selector lever (2nd mechanic).
- When moving the gearshift lever, the transmission selector lever shall have a travel of approximately 1 mm -arrow-.



R34 0033

or

- Otherwise, readjust the gear selection lever mechanism  
[⇒ page 43](#).



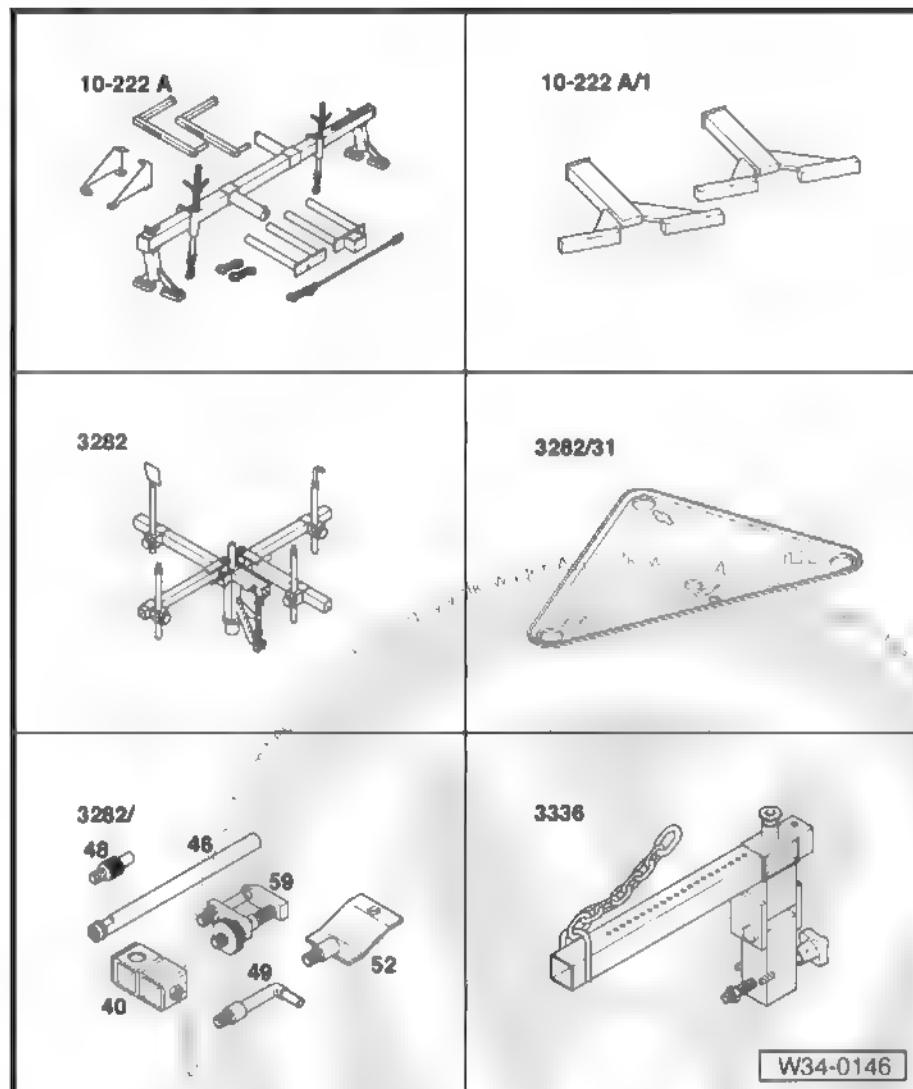
R34 10147



## 2 Transmission - remove and install

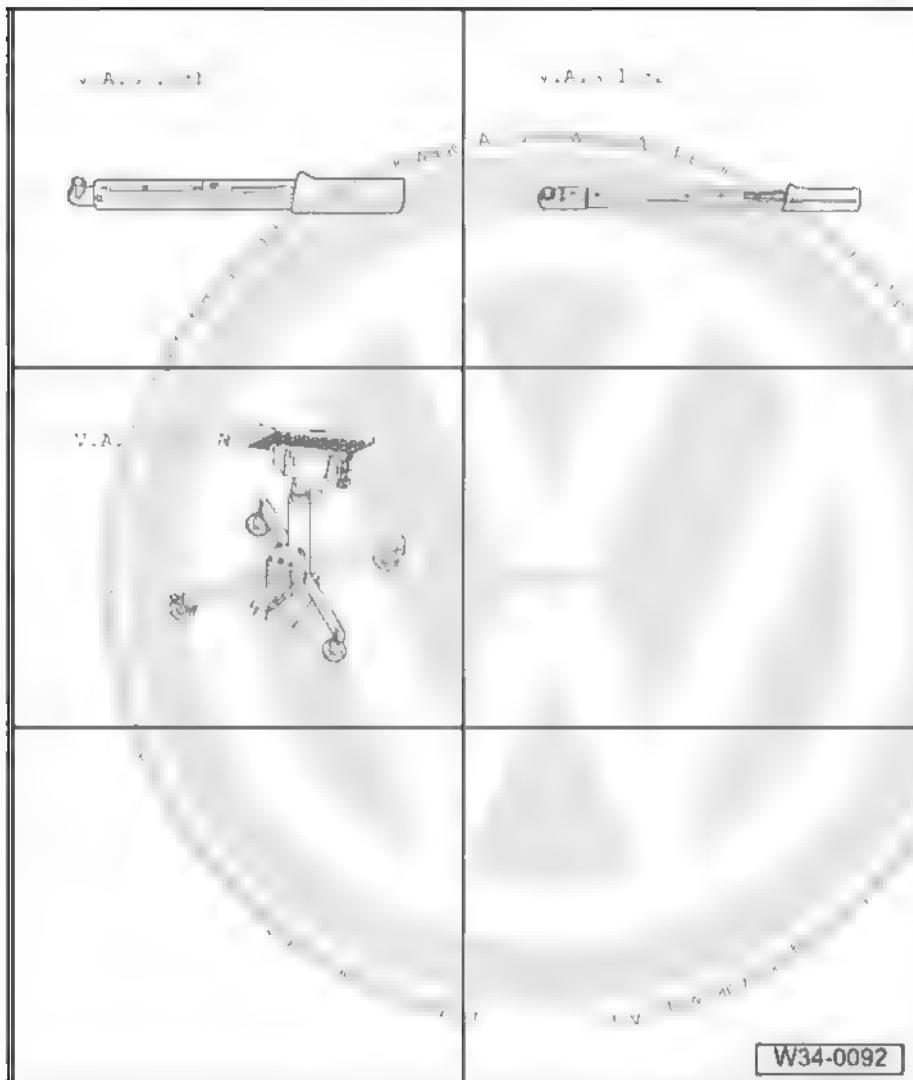
### Special tools and workshop equipment required

- ◆ Bracket or VW 061  
-10-222A-
- ◆ Bracket -10-222 A/1-
- ◆ Support -3282-
- ◆ Adjustment plate -3282/31-
- ◆ Pin -3282/48-
- ◆ Support -3282/59-
- ◆ Support -3336-

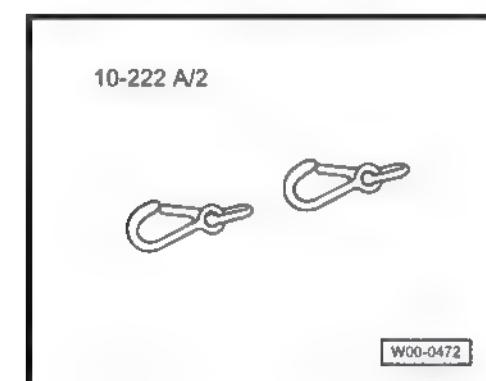




- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-
- ◆ Torquemeter - 40 to 200 Nm (socket 1/2") -VAG 1332-
- ◆ Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A-



- ◆ Additional hook -10-222 A/2-



No illustration:

Lifting eyelets -030 103 390 F- (on pulley side), -030 103 390 G- (on inertial flywheel side).

## 2.1 Removal

- Disconnect and remove the Battery -A- ➔ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .

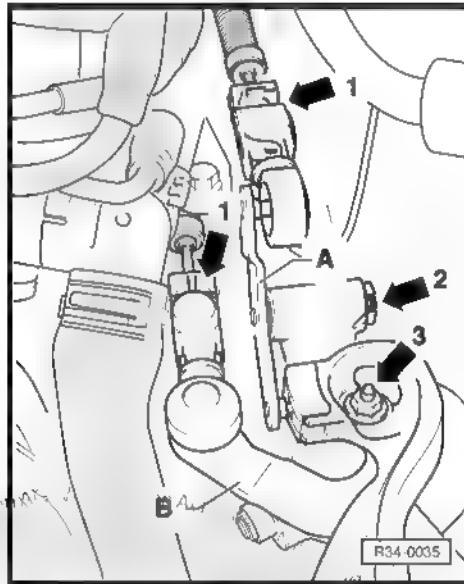


Note

- ◆ Check whether the vehicle has a coded radio. If so, request the anti-theft code before disconnecting the Battery's earth strap Battery -A-.
- ◆ When the Battery -A-, check the vehicle's equipment (radio, clock, electric door locks, power windows, etc.) according to the repair manual and/or instructions for use
- Remove the console for the Battery -A- ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .
- When air filter is installed behind the Battery -A- , it must also be removed ⇒ Engine; Rep. Gr. 24 ; Fuel supply - injection system .

Continues for vehicles with gearshift mechanism (version 1):

- Remove the safety mechanism of the cable fastening elements -arrow 1-.
- Remove the circlip -arrow 2- from inversion lever -A- and remove lever.
- Loosen nut -arrow 3- and remove the transmission selector lever -B-.

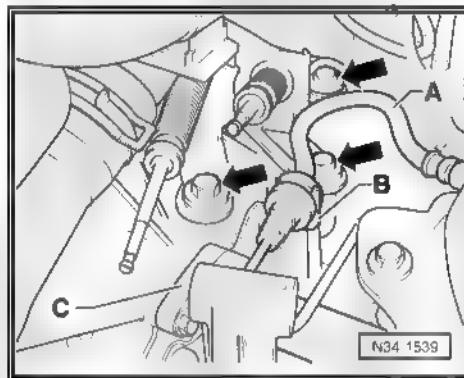


- Loosen the fastening screws -arrows- from transmission cable fastening support and remove fastening support from transmission cables.
- Remove tubing and hose assembly -A- on the support -B- located on transmission.
- Remove the slave cylinder on the hydraulic drive -C- without opening the pipes and fasten it.



Note

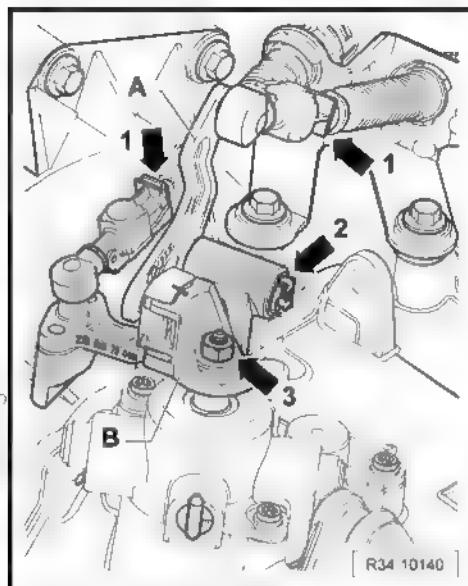
*Do not press the clutch pedal*



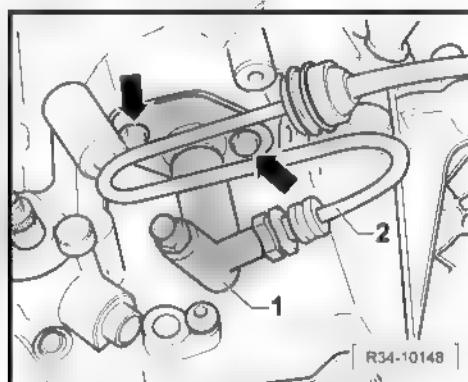
Continues for vehicles with gearshift mechanism (version 2):



- Remove the safety mechanism of the cable fastening elements -arrow 1-
- Remove the circlip -arrow 2- from inversion lever -A- and remove lever
- Loosen nut -arrow 3- and remove the transmission selector lever -B-



- Loosen the fastening screws -arrows- and remove slave cylinder from hydraulic drive -1- without opening tubing -2-.



- Loosen the fastening screws -arrows- from the attaching support of the transmission cables.
- Remove the fastening support of the transmission cables.

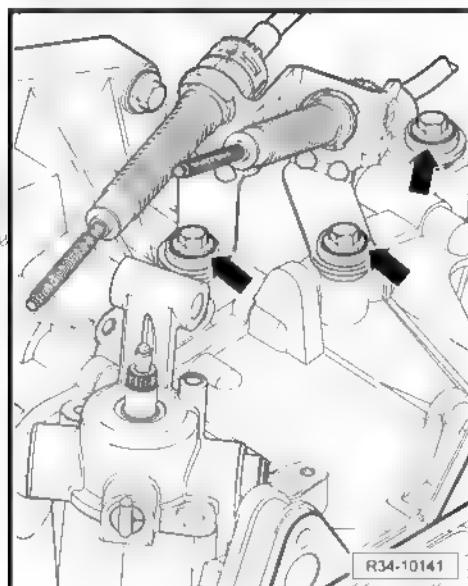


#### Note

*Clutch pedal must not be depressed.*

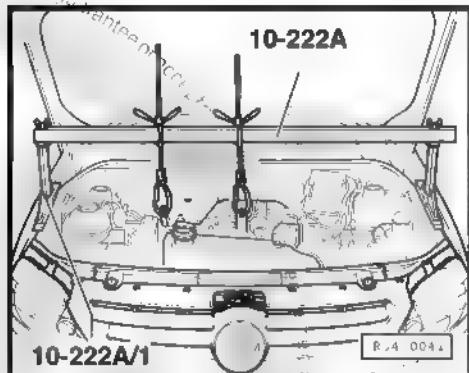
Continuation for all vehicles:

- Remove earth strap from the upper fastening screw on the engine/transmission.
- Loosen upper screws fastening the engine to transmission.
- Loosen upper fastening screw on the starter.
- Install the Bracket or VW 061-10-222A- with Bracket -10-222 A/1- and sustain slightly the engine/transmission





For vehicles up to model-year 2010



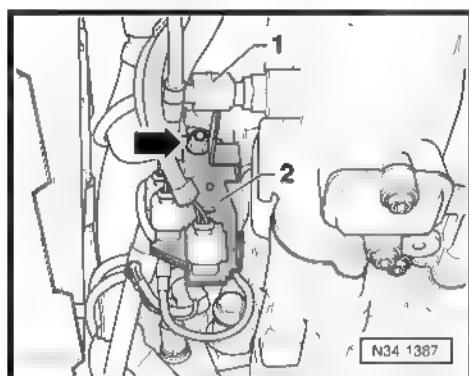
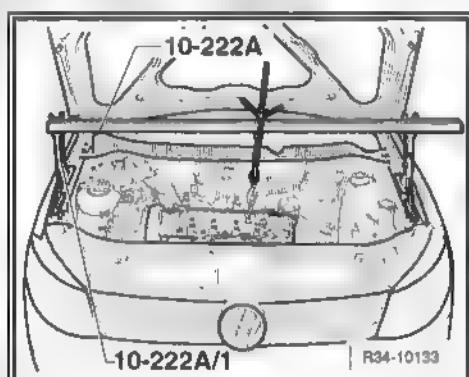
For vehicles up from model-year 2011:



Note

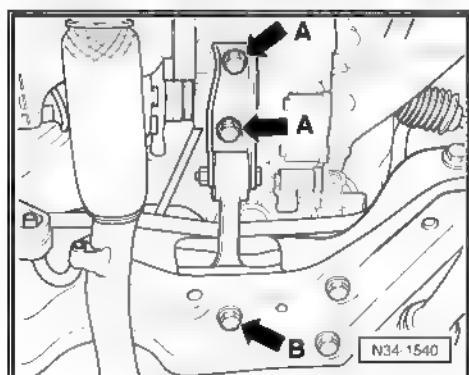
If necessary, use the lifting eyes -030 103 390 F- (on pulley side), -030 103 390 G- (on inertial flywheel side).

- Relieve the engine/transmission assembly weight through the spindles.
- Loosen left front wheel screws,
- Lift the vehicle.
- Remove the left front wheel.
- Remove noise insulation and the left front wheel case cover  
⇒ Body - external mountings; Rep. Gr. 66 ; External equipment .
- Pull off connector -1- for reverse gear lights.
- Loosen the attaching nut -arrow- and remove the cable support -2- of Starter -B- .
- Remove the Starter -B- ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .
- Remove connectors' bracket.



- Loosen the fastening screws -arrows A- and -arrows B- and remove pendulum support.

For vehicles without ABS:

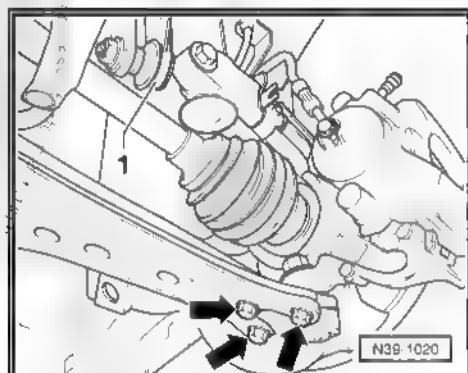
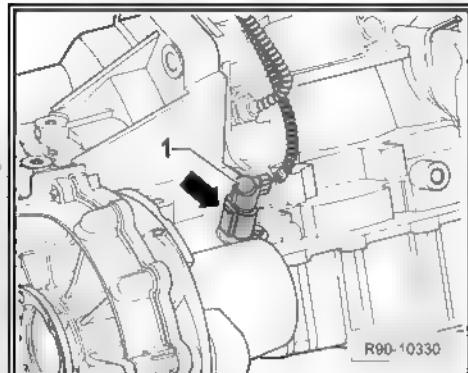




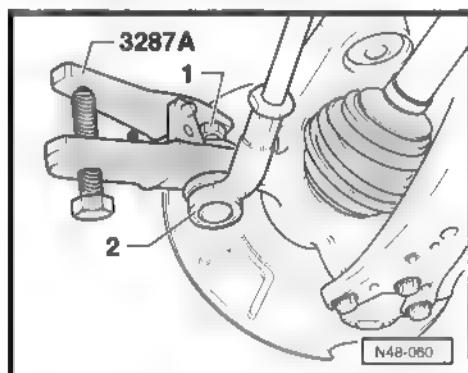
- Pull off connector -1- of Speed sensor -G22- .

**Continuation for all vehicles:**

- Remove the front exhaust tube ⇒ Engine, Rep. Gr. 26 ; Exhaust system .
- Remove drive semi-shafts from transmission propulsion flanges ⇒ Running gear, ??axles, ??steering, Rep. Gr. 40 ; Front suspension . When doing this, take care to prevent damages on the flange protective plate
- Mark the installation position of the screws that fasten the lower articulation of the suspension's left wishbone
- Loosen the screws -arrows-.
- Release the wishbone from the left coupling bar -1-.



- Loosen the attaching nut -1- of connection rod
- Detach the steering track rod ball point -2- from the steering knuckle arm ⇒ Running gear, ??axles, ??steering; Rep. Gr. 48 ; Steering .
- Move the wheel bearing case outwards.

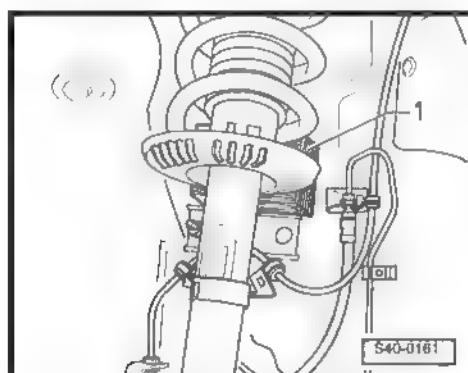


- Turn the suspension outward and support, for example, with a wooden block -1- and simultaneously move the semi-drive shaft through the space between the subframe and the transmission
- Place the drive semi-shaft upwards (left side) and fasten it with wire on the suspension pillar.



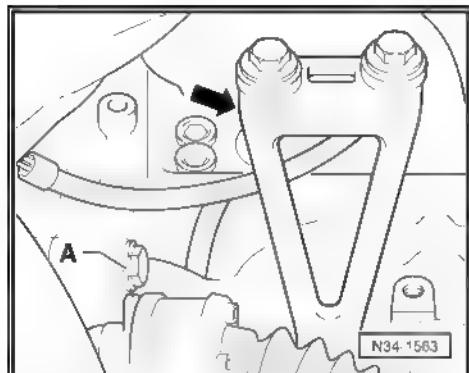
#### Note

*The drive axle shaft must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting.*





- Loosen the screw -A- fastening the engine to transmission by over the right propelling flange



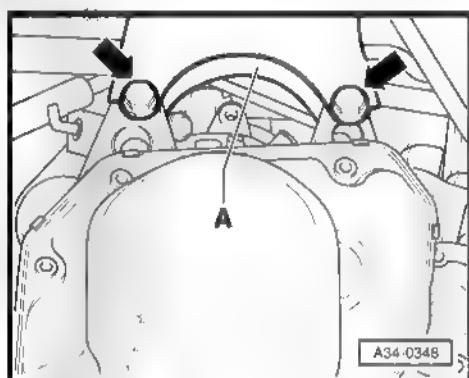
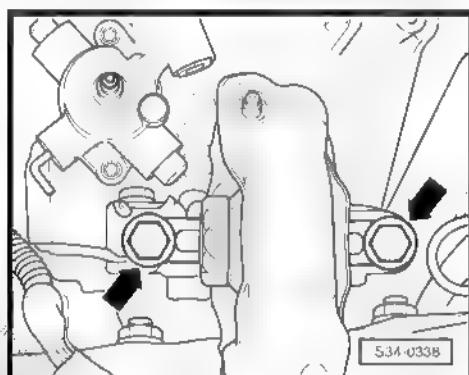
- Loosen hexagon screws -arrows- on engine left support.
- Tilt carefully the engine/transmission assembly. To do that, turn the two screws on the Bracket or VW 061-10-222A- approximately 90 mm downwards.



Note

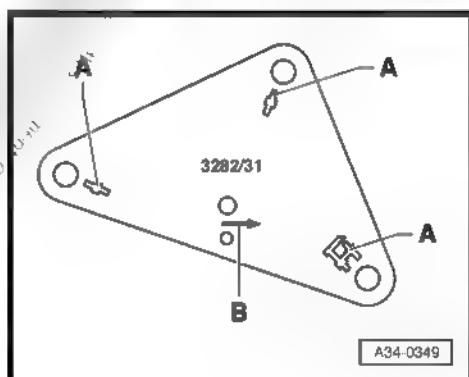
*When lowering the engine, make sure the differential is not supported by the subframe.*

- Thus, it should be possible accessing the screws -arrows- that fasten the console -A-.
- Loosen the fastening screws -arrows- and remove the console -A-.
- Install the Support -3282- with Adjustment plate -3282/31- to remove transmission.
- Install the transmission support assembly arms aligned with the adjustment plate holes.



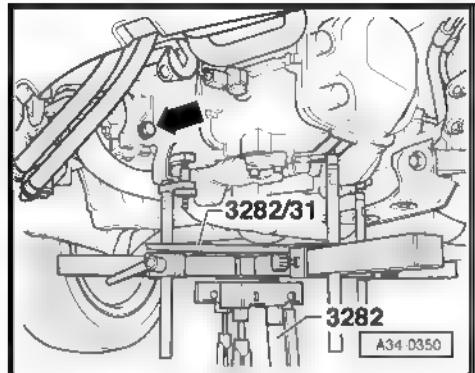
The symbols -A- on the Adjustment plate -3282/31- show the supports required, and arrow -B- indicates run direction.

- Position the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- under the transmission.





- Align the adjustment plate and engage safety bracket in transmission
- Fasten transmission to Support -3282- and loosen screw fastening engine to transmission -arrow-

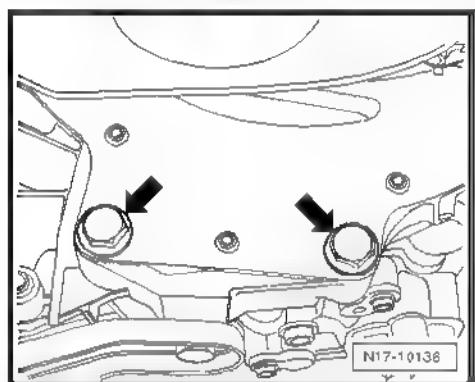


- For vehicles with crankcase on plate, it is necessary to disassemble a cover plate -arrows- on the engine crankcase area.
- Separate transmission from engine and turn it carefully towards subframe.
- Press the engine outwards, carefully, with the help from a second mechanic.

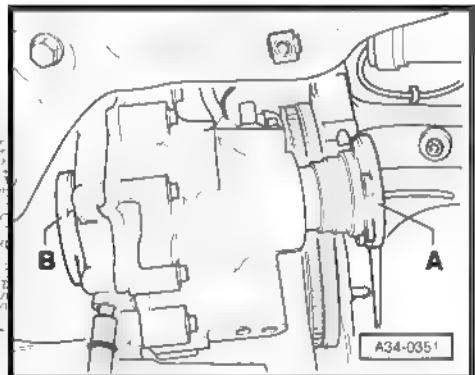


#### Caution

*Don't let the engine/transmission in contact with the electro fan/radiator during this operation.*



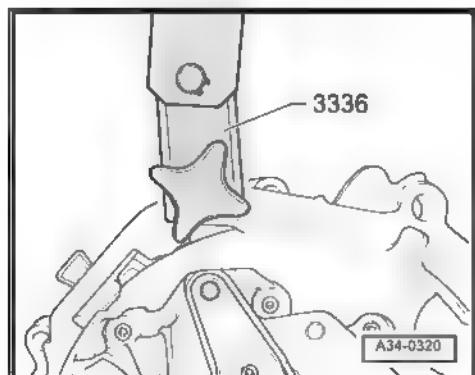
- Turn the transmission downwards by the differential region.
- Next, lower carefully the transmission by passing the right propelling flange -A- close to the flywheel/intermediate plate, and the left propelling flange -B- close to the subframe.
- When lowering, change the transmission position by the spindle of the Engine and gearbox jack + gearbox or EQ 7081 - VAG 1383A-.



### 2.1.1 Transmission transport

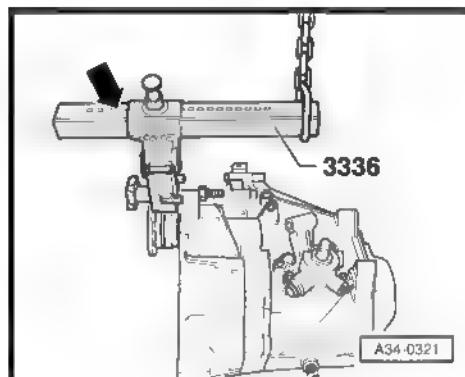
Using Support -3336- to transport the transmission.

- Install the Support -3336- on the transmission case.





- Adjust arm on guide with locking pins -arrow- in order to expose 5 holes



## 2.2 Installation



### WARNING

*Always replace self-locking nuts and bolts which were subjected to angular torque.*

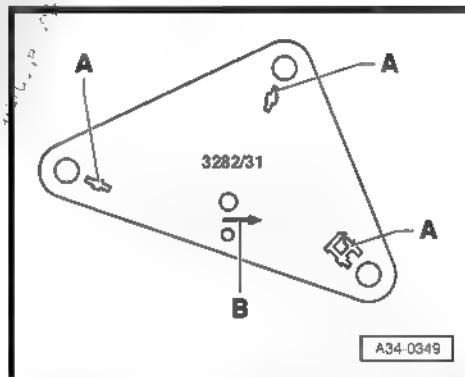
- Clean the splines on the main drive shaft and lightly grease them with the Lubricating grease -G 000 100-. Refer to the ⇒ Chemical Materials Manual .

The clutch disc can easily displace from one side to another on the primary shaft.

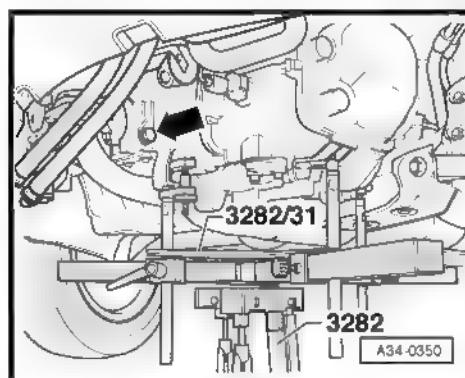
- Check that the adjustment pins are installed on the crankcase for aligning engine/transmission, and install them, if required.
- Make sure the intermediate plate is correctly installed on engine.
- Install the Support -3282- with Adjustment plate -3282/31- to install transmission.

The symbols -A- on the Adjustment plate -3282/31- show the supports required, and arrow -B- indicates run direction.

- Align the plate in parallel to transmission and engage safety bracket on transmission.
- Fasten transmission to Support -3282- .



- Position the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- under vehicle



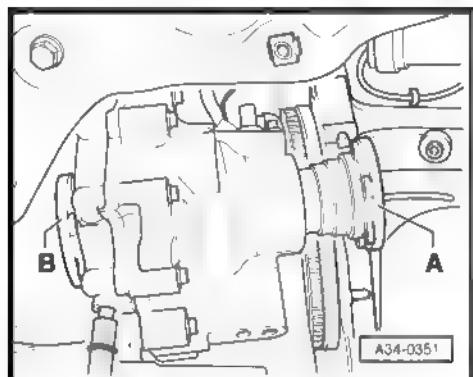


- Raise carefully the transmission by passing the right propelling flange -A- close to the flywheel/intermediate plate, and the left propelling flange -B- close to the subframe.
- When raising, change the transmission position by the spindle of the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- .
- Then, through the Support -3282- fuses, turn the gearbox upwards by the differential area.
- Install transmission

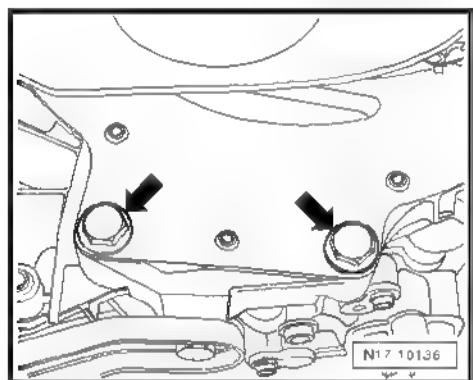


**Note**

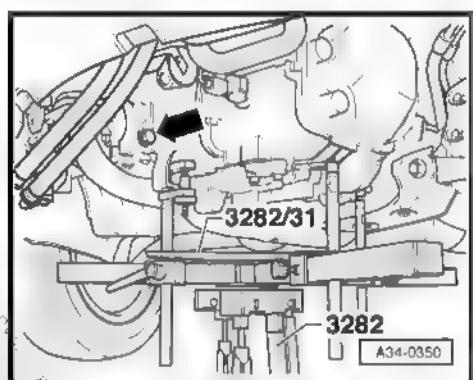
*Pay attention to prevent damages on the cooling hose, located between engine and radiator, and the power steering pipes*



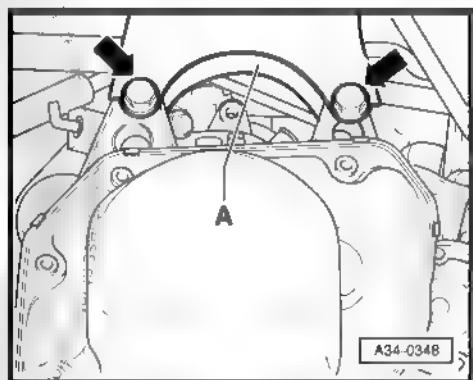
- For vehicles with crankcase on plate, it is necessary to assemble a cover plate -arrows- on the engine crankcase area.



- Tighten the screw -arrow- that fastens the engine and the transmission.
- Tighten the lower screws that fasten the engine to transmission.



- Install transmission console -A- by using new screws -arrows-.
- Lubricate with oil the left support pad on engine and the upper part of the transmission console => Electronic Parts Catalogue (ETKA).
- Align engine/transmission assembly, by placing it in assembling position. To do that, turn the two screws on the Bracket or VW 061 -10-222A- upwards.



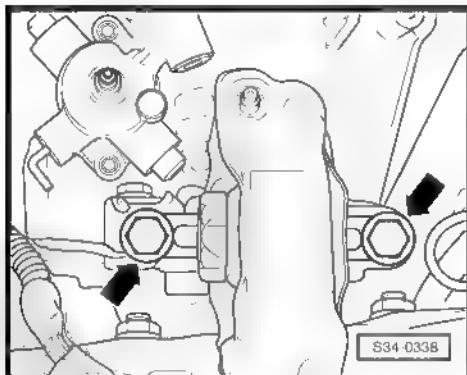


- Install hex screws -arrows- on engine left support.

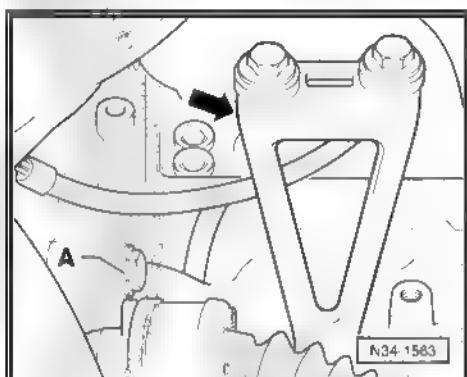


**WARNING**

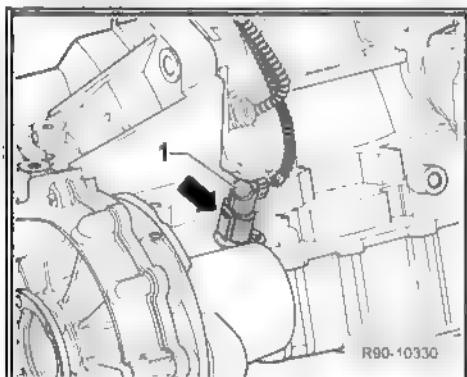
*Do not remove Bracket or VW 061-10-222A- until tightening the left bracket screws on the engine to the corresponding tightening torque.*



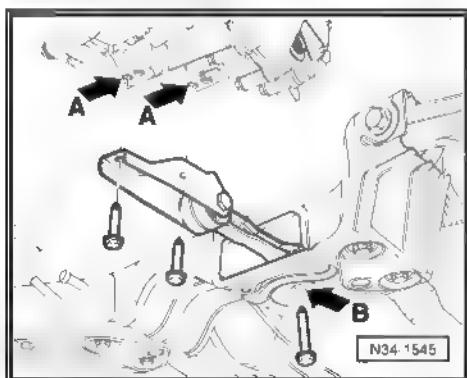
- Tighten the upper screws that fasten the engine to transmission
- Tighten the screw -A- fastening the engine to transmission by over the right propelling flange.
- Install intake manifold supports -arrow-, if applicable.



- Push on connector -1- of Speed sensor -G22- .



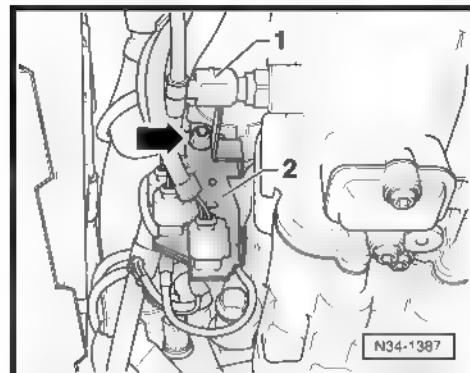
- Install pendulum support -arrows A- and -arrows B- by using new screws.
- Install front exhaust system ⇒ Engine; Rep. Gr. 26 ; Exhaust system .
- Install the screws that fasten the lower articulation of the suspension's left wishbone.
- Install drive semi-shafts to transmission propulsion flanges ⇒ Running gear, ??axles, ??steering; Rep. Gr. 40 ; Front suspension .
- Install connectors on their brackets
- Install the Starter -B- ⇒ Electrical equipment, Rep. Gr. 27 ; Starter, alternator, battery .



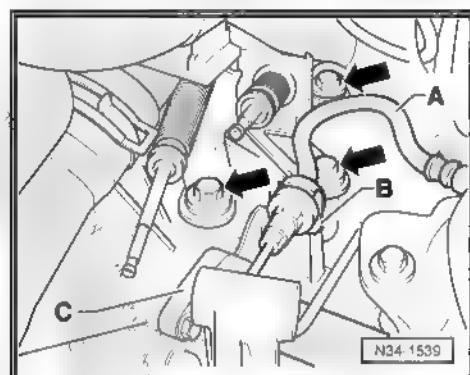


- Install support -2- on starter -arrow-.
- Push on connector -1- for reverse gear lights
- Install earth strap on the upper fastening screw on the engine/transmission

Continues for vehicles with gearshift mechanism (version 1):



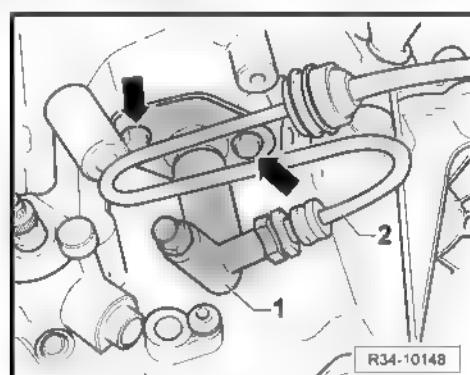
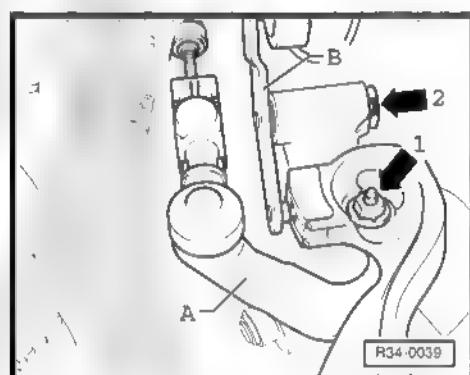
- Install the receiving cylinder of the hydraulic drive -1-.
- Install tubing and hose assembly -A- on support -B- located on transmission.
- Install the cable fastening support on transmission -arrows-.



- Install transmission selector lever -A-.
- Tighten the hex nut -arrow 1-.
- Install inversion lever -B- by fastening it with circlip -arrow 2-.
- Install gear and track selector cables on the corresponding fastening elements.

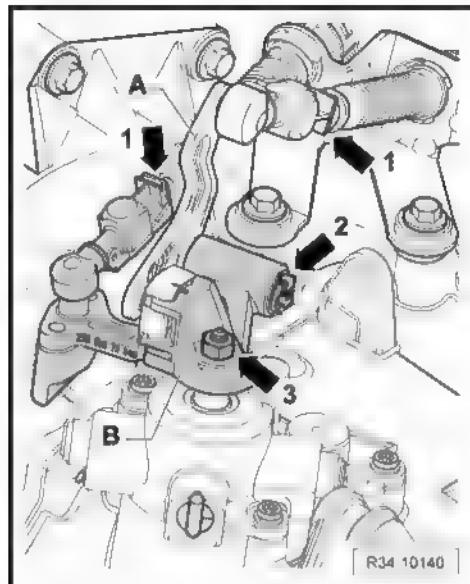
Continues for vehicles with gearshift mechanism (version 2):

- Install transmission cable fastening support and tighten fastening screws -arrow-.
- Install the receiving cylinder of the hydraulic drive -1- and tighten the fastening screws -arrows-.





- Install transmission selector lever -B- and tighten the fastening nut -3-.
- Install inversion lever -A- by fastening it with circlip -arrow 2-.
- Install gear and track selector cables on the corresponding fastening elements
- Adjust the gear selection mechanism → [page 43](#).
- Install the front left wheel. Tightening torques, refer to: ⇒ Running gear, ??axles, ??steering; Rep. Gr. 44 ; Wheels, tires, vehicle measurement
- Check transmission oil → [page 63](#).
- Install noise insulation and wheel case protection.
- Install the air filter, it is installed behind the Battery -A- ⇒ Engine; Rep. Gr. 24 ; Fuel supply - injection system .
- Install the console for the Battery -A- ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .
- Connect the Battery -A- ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .



## 2.2.1 Tightening torque



### WARNING

*Always replace self-locking nuts and bolts which were subjected to angular torque.*

#### Transmission to engine

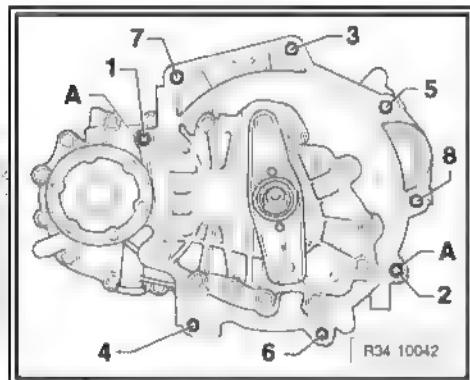
##### Vehicles with 1.6 l engines

Strictly follow the tightening sequence showed by the illustration

pos.	Screw	Nm
1	M 12 x 70	80
2	M 12 x 55	80
3	M 12 x 55	80
4	M 10 x 50	40
5 <sup>2)</sup>	M 12 x 125	80
6	M 10 x 50	40
7	M 12 x 55	80
8 <sup>2)</sup>	M 12 x 125	80

2) Also used for fastening the starter to transmiss on

-Item A- - Adjustment pins



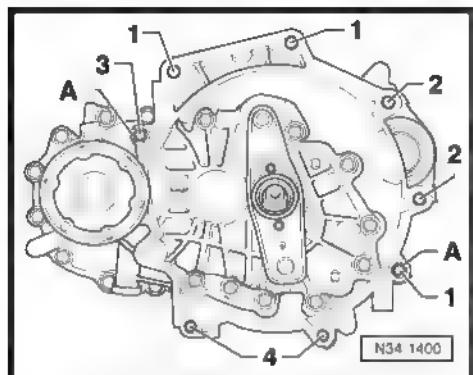


**Vehicles with 3-cylinder engines 1.2 l - 40 kW and 3-cylinder engines 1.2 l - 47 kW**

pos.	Screw	Units	Nm
1	M 12 x 65	3	80
2 <sup>3)</sup>	M 12 x 135	2	80
3	M 12 x 80	1	80
4	M 10 x 60	2	40

3) Also for fastening the starter to transmission

-Item A- - Adjustment pins



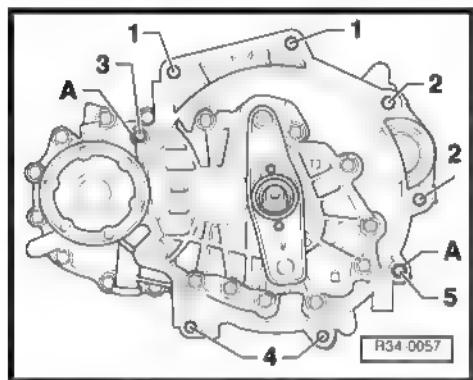
N34 1400

**Vehicles with 4-cylinder engines 1.4 l - 55 kW**

pos.	Screw	Units	Nm
1	M 12 x 55	2	80
2 <sup>4)</sup>	M 12 x 125	2	80
3	M 12 x 70	1	80
4	M 10 x 35	2	40
5	M 12 x 65	1	80

4) Also for fastening the starter to transmission

-Item A- - Adjustment pins



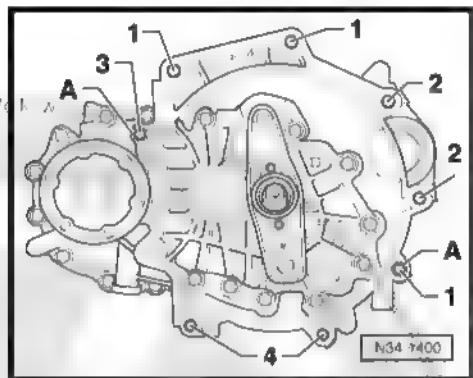
R34 0057

**Vehicles with 4-cylinder engines 1.4 l - 63 kW and 4-cylinder engines 1.4 l - 74 kW**

pos.	Screw	Units	Nm
1	M 12 x 65	3	80
2 <sup>5)</sup>	M 12 x 140	2	80
3	M 12 x 80	1	80
4	M 10 x 50	2	40

5) Also for fastening the starter to transmission

-Item A- - Adjustment pins



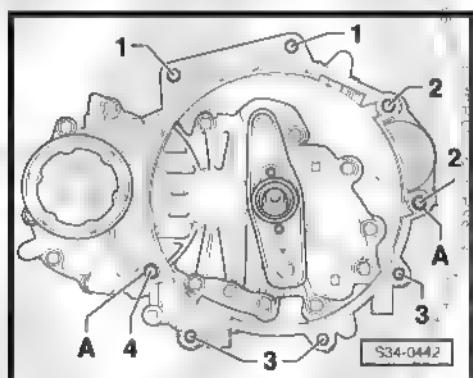
N34 1400

**Vehicles with 1.4 l - 51 kW Diesel engines**

pos.	Screw	Units	Nm
1	M 12 x 70	2	80
2 <sup>6)</sup>	M 12 x 150	2	80
3	M 10 x 70	3	40
4	M 12 x 80	1	80

6) Also for fastening the starter to transmission

-Item A- - Adjustment pins



S34-0442

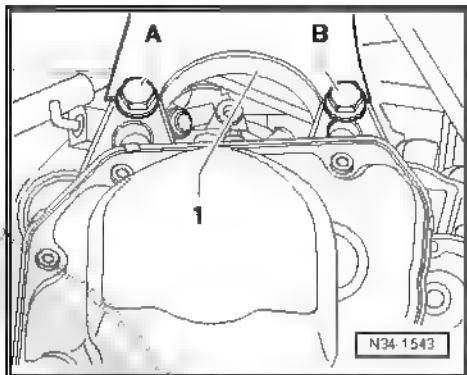


Console -1- to transmission

Screw -A and B-

40 Nm + 90°

- Replace screws



Transmission to body

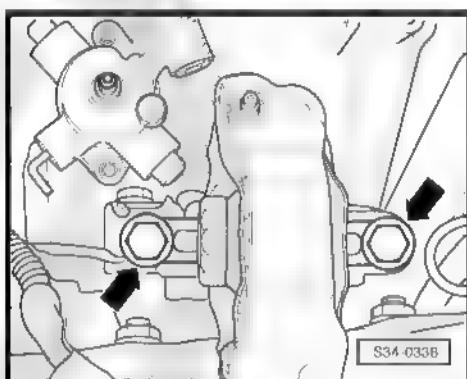
Screw -arrows-

40 Nm + 90°

- Replace screws.



*Install engine/transmission support without tensions. ⇒ Engine; Rep. Gr. 10 ; Cylinders, engine block, support, cover*



*Slave cylinder on transmission ⇒ Item 12 (page 19)*

*Selector lever to selector lever shaft ⇒ page 32 .*

*Cable fastening support to transmission ⇒ page 32 .*

*For other torques, refer to the respective repair groups*

*Drive semi-shaft to propelling flange ⇒ Running gear, ??axles, ??steering; Rep. Gr. 40 ; Front suspension .*

*Lower drive to wishbone ⇒ Running gear, ??axles, ??steering; Rep. Gr. 40 ; Front suspension .*

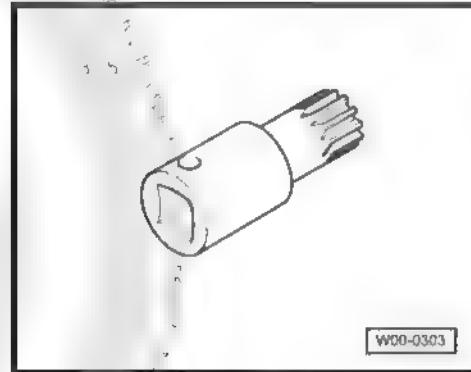
*Coupling bar to wishbone ⇒ Running gear, ??axles, ??steering; Rep. Gr. 40 ; Front suspension .*



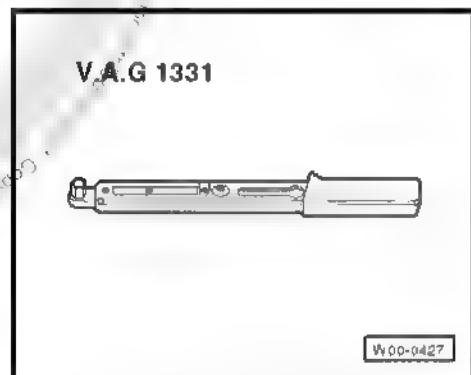
### 3 Transmission oil level - check and replenish

Special tools and workshop equipment required

- ◆ Multi-tooth socket SW 27 -3357-



- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-



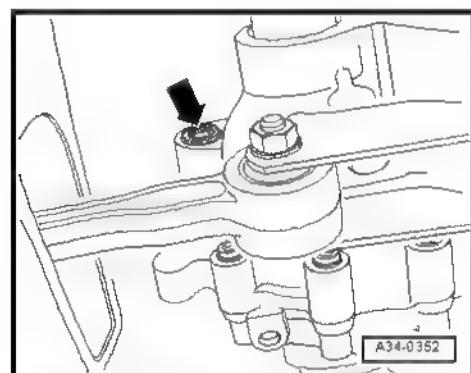
#### 3.1 Oil level - check

Transmission oil specification [⇒ page 1](#).

- Loosen the screw to check the oil -arrow-.

The oil level will be OK if the transmission has oil up to the lower edge of the checking hole.

- Install screw -arrow-.

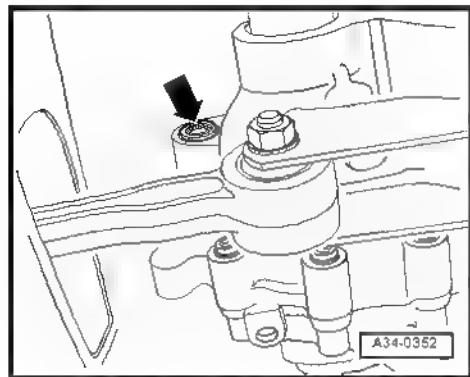


#### 3.2 Oil level - replenish

To fill completely the reservoir with new oil:



- Loosen the screw -arrow-
- Fill in with oil up to the lower edge of the checking hole
- Install screw -arrow-.
- Start engine, engage a gear and let the transmission operate for approx 2 minutes.
- Stop engine and replenish the oil up to the lower edge of the checking hole.
- Install screw -arrow-.

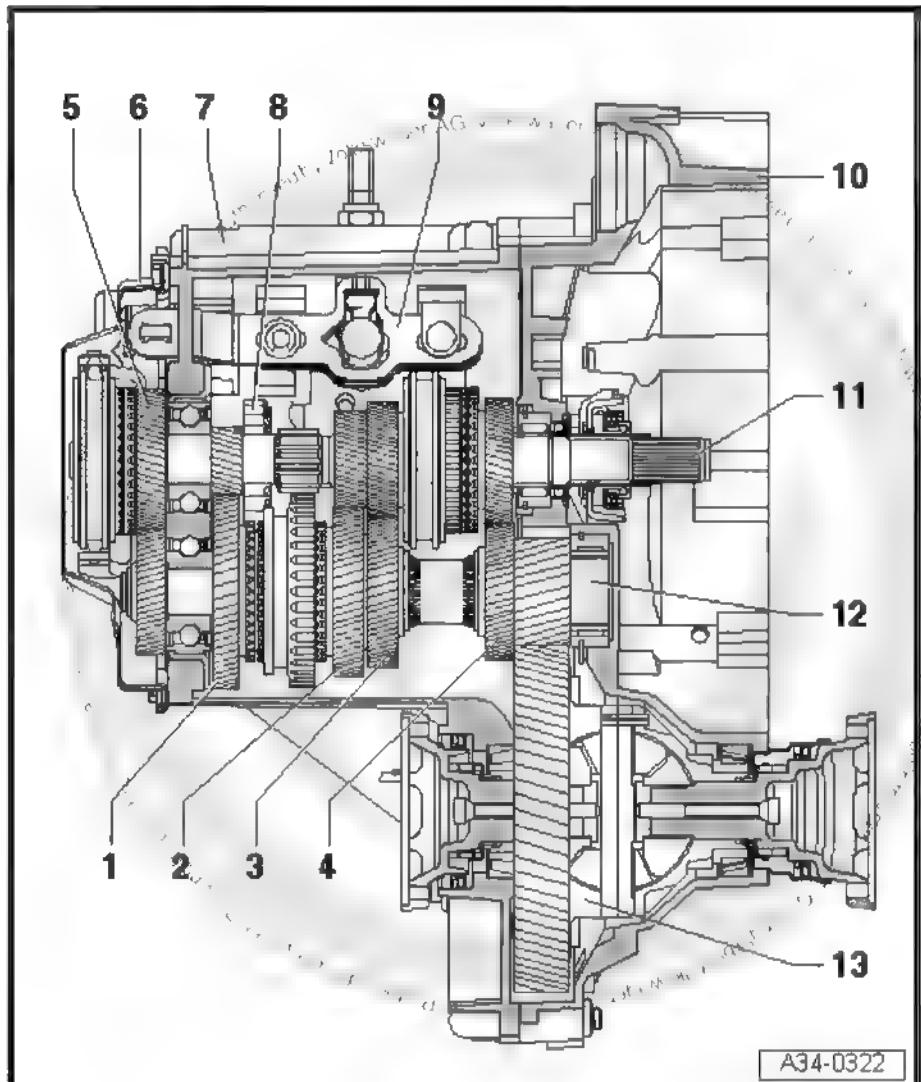




## 4 Transmission - disassemble and assemble

### 4.1 Transmission overview

- 1 - 1nd. gear
- 2 - 2nd. gear
- 3 - 3rd. gear
- 4 - 4nd. gear
- 5 - 5nd. gear
- 6 - Transmission case cover
- 7 - Transmission case
- 8 - Reverse gear
- 9 - Selection mechanism
  - Selection forks
- 10 - Clutch case
- 11 - Primary shaft
- 12 - Secondary shaft/pinion shaft
- 13 - Differential



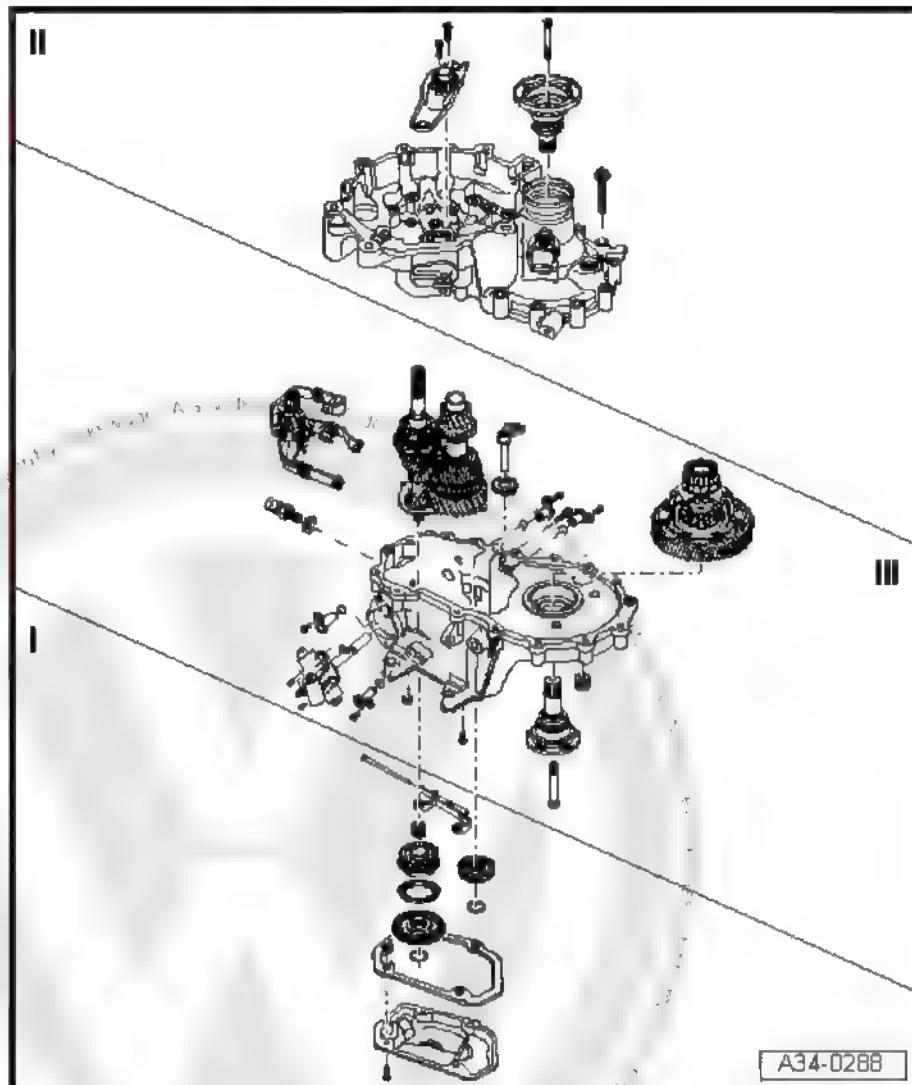


## 4.2 Transmission - assembly overview

I - Transmission case cover  
and 5nd. gear [→ page 67](#)

II - Clutch case [→ page 68](#)

III - Primary shaft, pinion shaft,  
differential, selection mecha-  
nism and selection forks  
[→ page 69](#)





### 4.3 I - Gearcase housing cover and 5nd. gear

#### 1 - Transmission case

- Manufactured in aluminum or magnesium.
- Allocation ⇒ Electronic Parts Catalogue (ET KA).

#### 2 - Gear for the 5nd gear

- Installation position ⇒ [page 76](#)

#### 3 - Circlip

- Replace whenever removed.
- Determine thickness ⇒ [page 77](#).

#### 4 - Gasket

#### 5 - Gearbox housing cover



*When installing the gearbox cover on an installed gearbox, check and fill the oil to volume ⇒ [page 63](#).*

#### 6 - Screw

- 5 Nm + 90°.
- Replace whenever removed.

#### 7 - Circlip

- Replace whenever removed.
- Determine thickness ⇒ [page 77](#).

#### 8 - Synchronizer with engaging sleeve and stop ring for 5nd. gear

- Disassemble and assemble ⇒ [page 90](#).

#### 9 - Synchronizer ring for 5nd. gear

#### 10 - Selector gear for 5nd. gear

- Installation position of 5nd. gear ⇒ [page 76](#)

#### 11 - Needle roller bearing

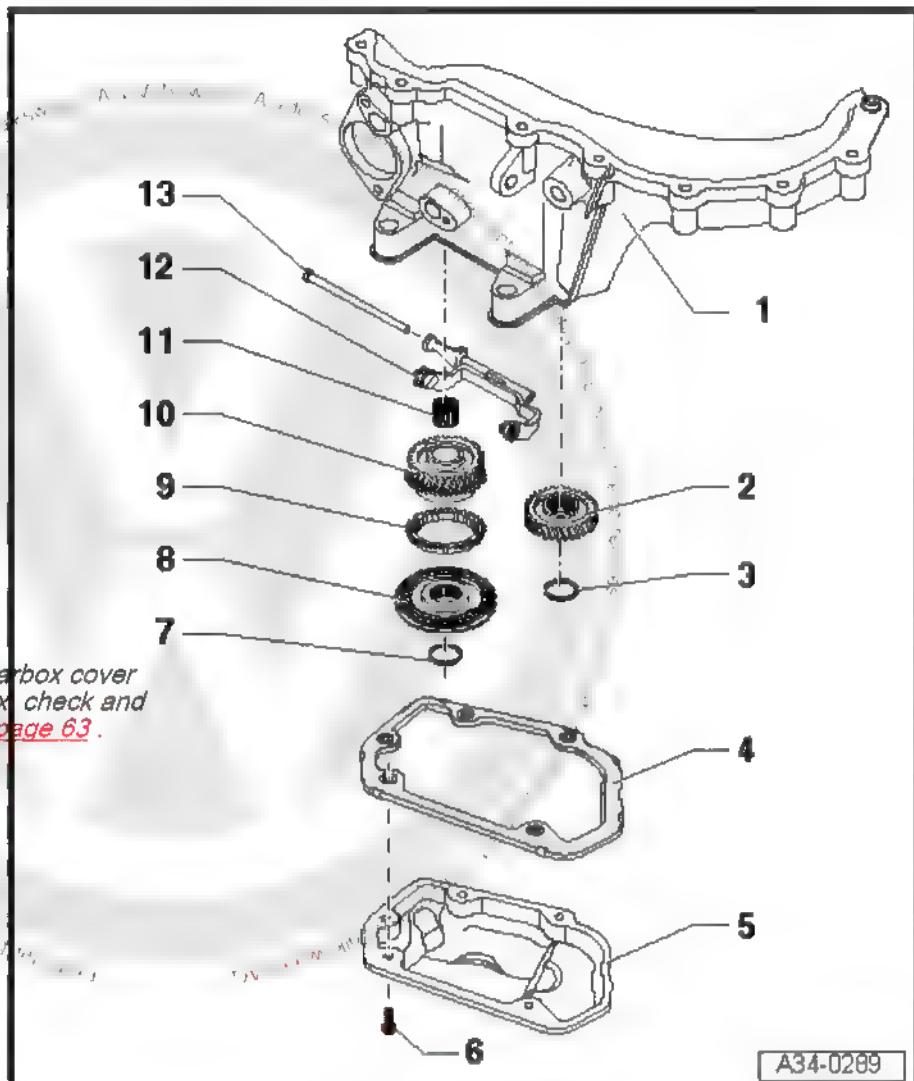
- For 5nd. gear wheel

#### 12 - Selector gear for 5nd. gear

- Disassemble and assemble ⇒ [page 86](#).

#### 13 - Bearing pin

- Selection fork for 5nd. gear wheel



A34-0289



## 4.4 II - Clutch case

### 1 - Tapered screw

- 25 Nm

### 2 - Propelling flange with pressure spring

### 3 - Screw

- 5 Nm + 90°.
- Replace whenever removed.

### 4 - Clutch case

- Manufactured in aluminum or magnesium
- Allocation ⇒ Electronic Parts Catalogue (ET-KA).
- Repair ⇒ [page 78](#).
- Whenever replaced, adjust the differential ⇒ [page 122](#).

### 5 - Transmission case

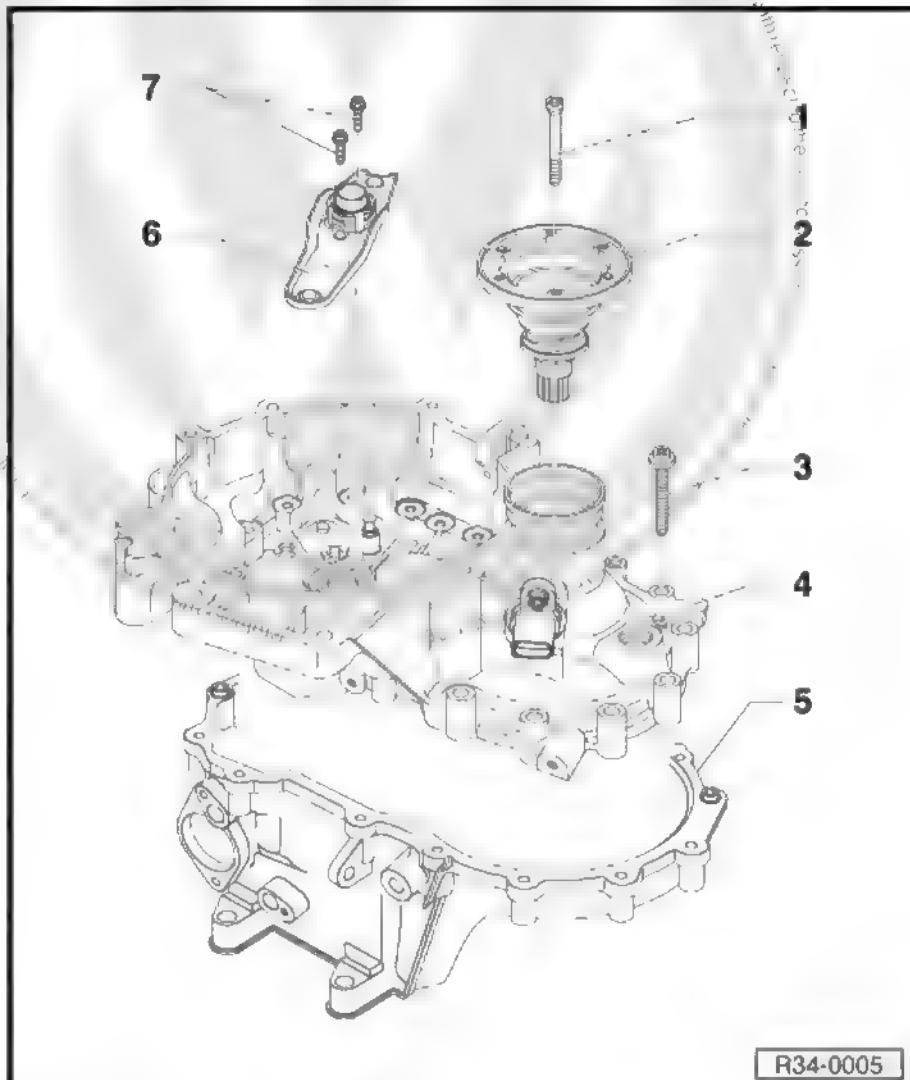
- Manufactured in aluminum or magnesium.
- Allocation ⇒ Electronic Parts Catalogue (ET-KA).
- Repair ⇒ [page 78](#).
- Apply the Sealing putty - AMV 188 200 03- evenly on the sealing surface.
- Whenever replaced, adjust the differential ⇒ [page 122](#).

### 6 - Clutch lever

- Remove and install with the roller bearing guide and clutch bearing.

### 7 - Screw

- 5 Nm + 90°.
- Replace whenever removed.





## 4.5 III - Primary shaft, pinion shaft, differential, selection mechanism and selection forks

### 1 - Differential

- Disassemble and assemble [page 113](#).

### 2 - Gearbox housing

- Repair [page 78](#).
- Apply the Sealing putty - AMV 188 200 03- evenly on the sealing surface.
- Whenever replaced, adjust the differential [page 122](#).

### 3 - Oil draining plug

- 25 Nm.

### 4 - Propelling flange

### 5 - Tapered screw

- 25 Nm.

### 6 - Screw

- Self-locking.
- 5 Nm + 90°.
- Replace whenever removed.
- For fastening the ball bearing support on the primary drive and pinion [Item 16 \(page 70\)](#).

### 7 - Hexagon nut

- 23 Nm.
- For the selection mechanism [Item 15 \(page 70\)](#).

### 8 - O-ring

- Replace whenever removed.

### 9 - Bearing pin

### 10 - Screw

- 5 Nm + 90°.
- Replace whenever removed.

### 11 - Selector lever shaft with selection mechanism cover

- Disassemble and assemble [page 84](#).
- Apply the Sealing putty - AMV 188 200 03- evenly on the sealing surface.

### 12 - Screw

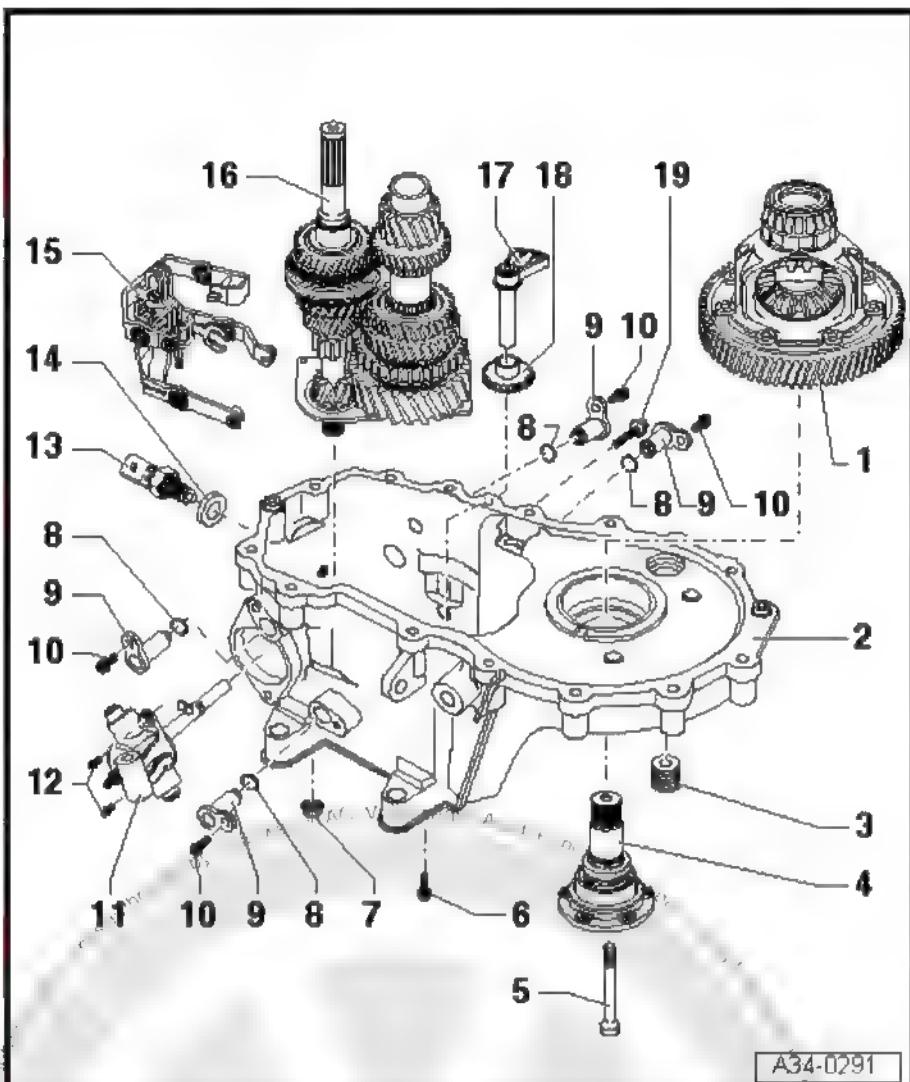
- 5 Nm + 90°.
- Replace whenever removed.

### 13 - Reverse gear light switch

- 25 Nm.

### 14 - Sealing ring

- Replace whenever removed.



A34-0291



15 - Selection mechanism

- Selection forks.
- Disassemble and assemble [page 86](#).

16 - Primary shaft and pinion shaft with ball bearing support

- Clean the threaded holes of the roller bearing support (e.g. Tap M6).
- Removing the roller bearing support [page 95](#)
- Disassemble and assemble the primary shaft [page 90](#)
- Disassemble and assemble the pinion shaft [page 101](#)

17 - Reverse gear intermediate shaft

18 - Reverse gear

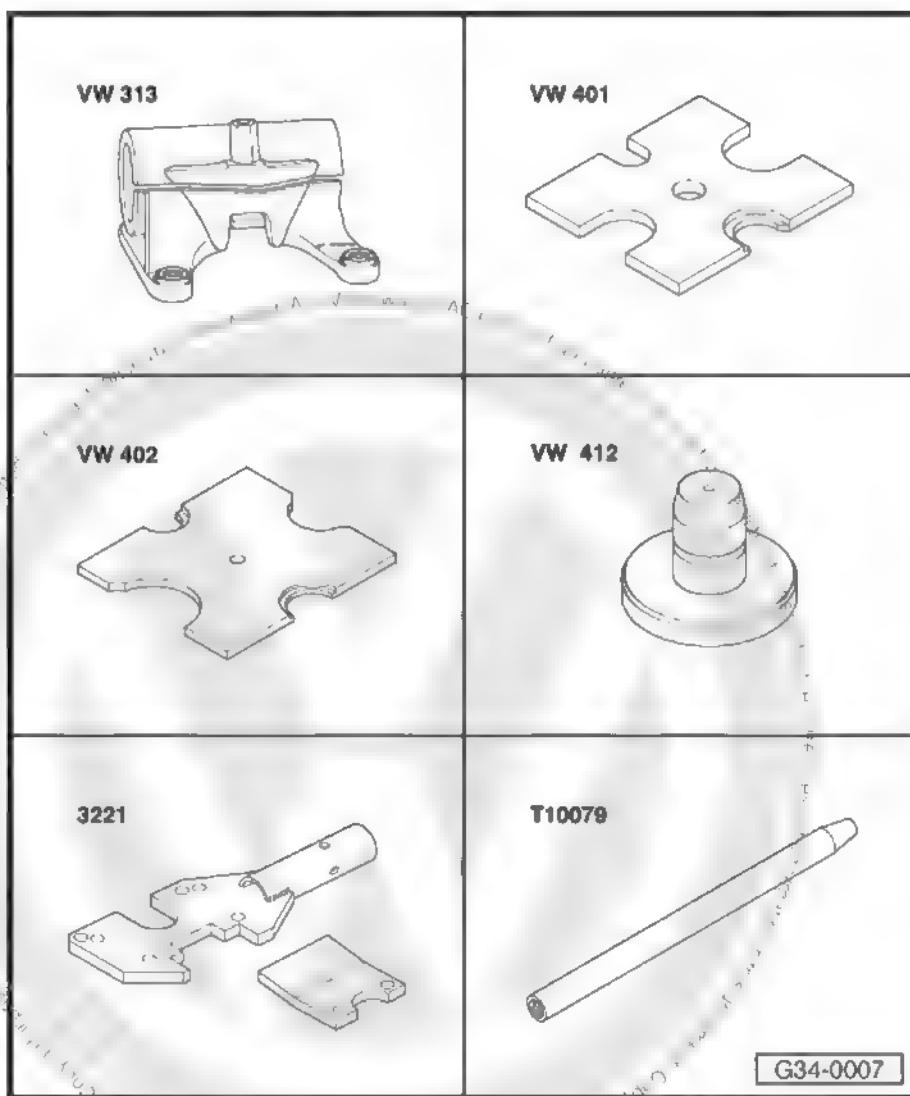
19 - Screw

- For reverse gear intermediate shaft.
- M6: 5 Nm + 90°.
- M8: 25 Nm + 90°.
- Replace whenever removed.

#### 4.6 Primary shaft, pinion shaft, differential, selection mechanism and selection forks - disassemble and assemble

Special tools and workshop equipment required

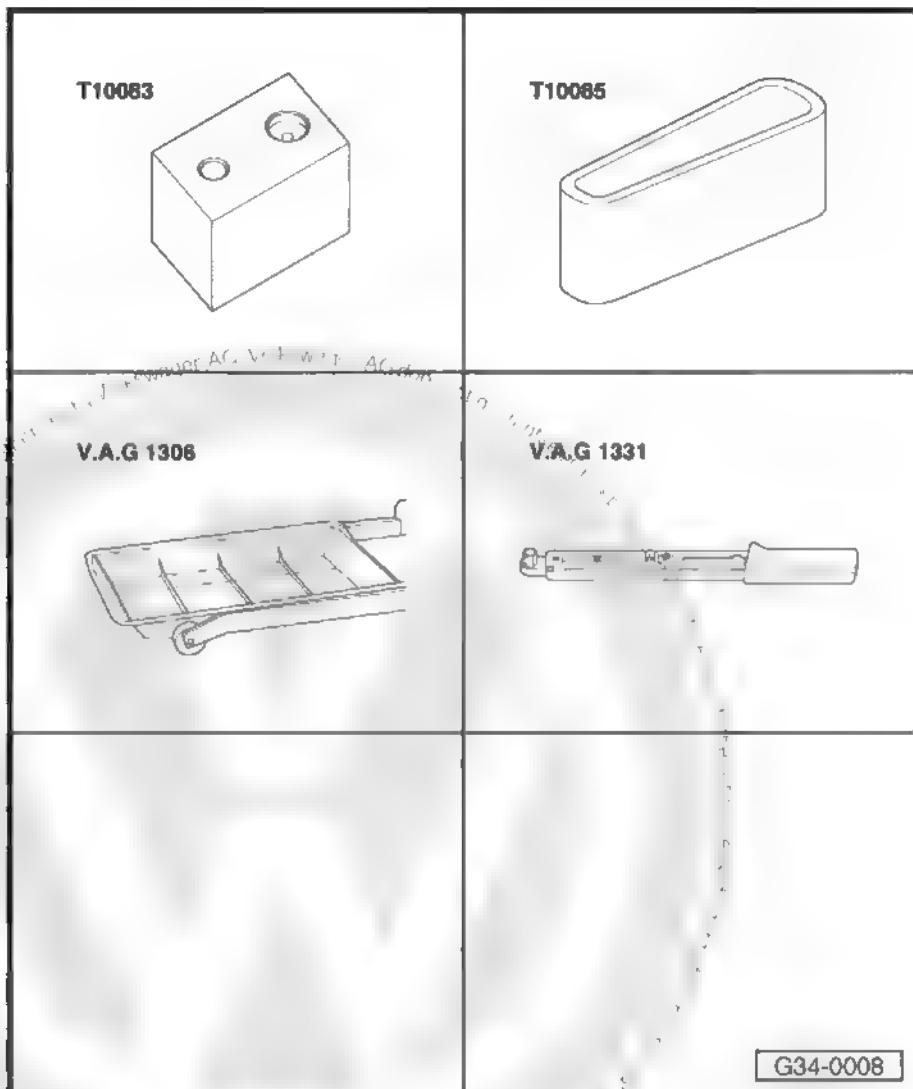
- ◆ Support for VW643 or VW 643/1 -VW 313- or Rotary stand for engine and transmission -VAS 6095-
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Pressure Disc -VW 412-
- ◆ Support -3221-





◆ Guide pin -T 10079-

- ◆ Pressure shim -T 10083-
- ◆ Pressure shim -T 10080-
- ◆ Drip tray -VAG 1306-
- ◆ Torque wrench - 5 to 50 Nm  
(socket 1/2") -VAG 1331-



**Change Support -3221- in the gearbox**

In order to secure manual gearboxes 02T and 0AP on the gearbox bracket, a new hole is required.

Dimensions given are in mm.

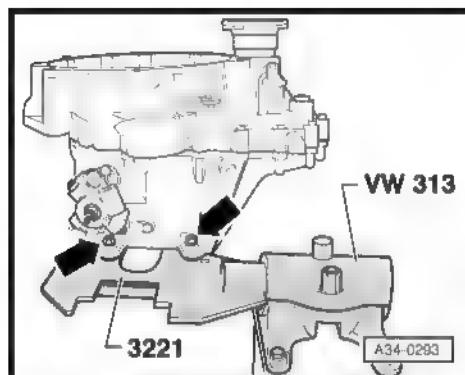
- Make a 11.0-mm Ø arrow- on the Support -3221- of the transmission



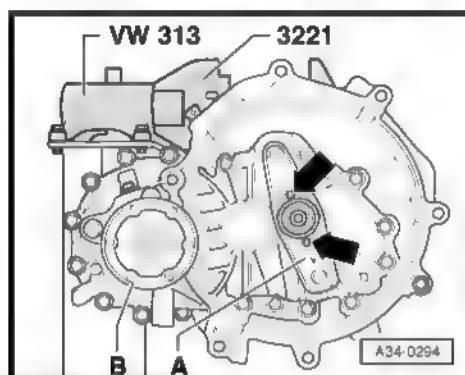


#### 4.6.1 Disassembly

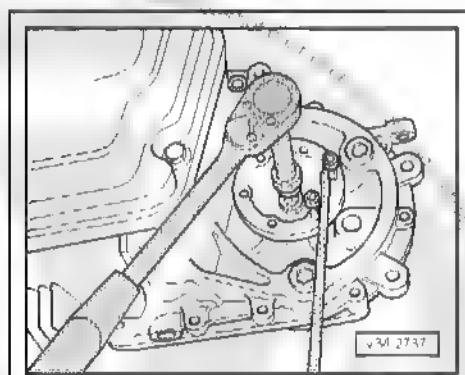
- Fasten the transmission on the Support for VW643 or VW 643/1 -VW 313- or Rotary stand for engine and transmission -VAS 6095- -arrows-
- Place a Drip tray -VAG 1306- under the transmission.
- Drain transmission oil [page 63](#).



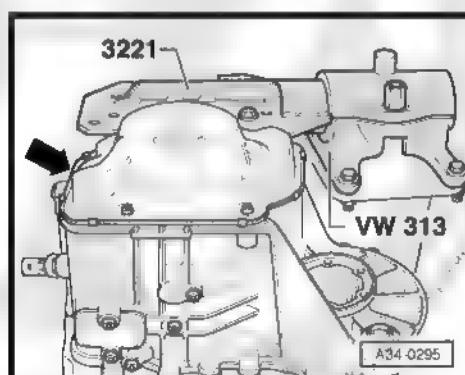
- Remove clutch lever -A- with the clutch bearing and bearing guide -arrows-.



- Remove the propelling flange fastening screw on right side -B-, by using two screws to lock the flange with a lever.
- Remove propelling flange.

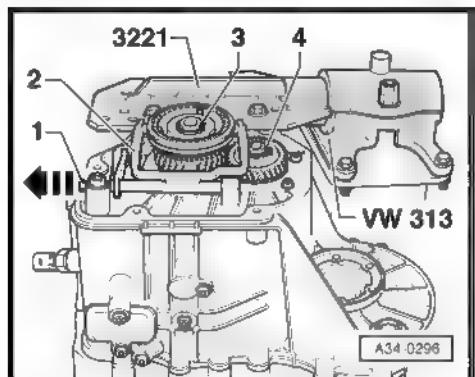


- Remove the transmission case cover -arrow-.

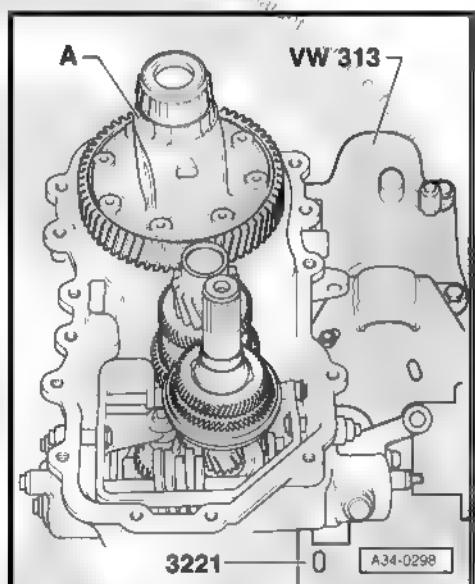
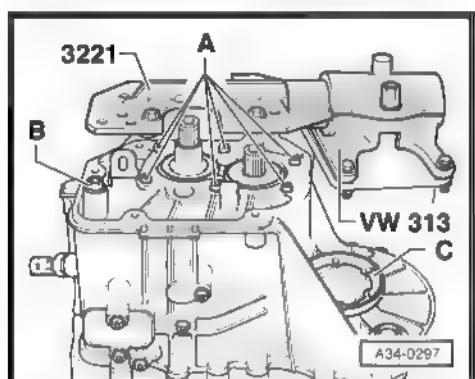




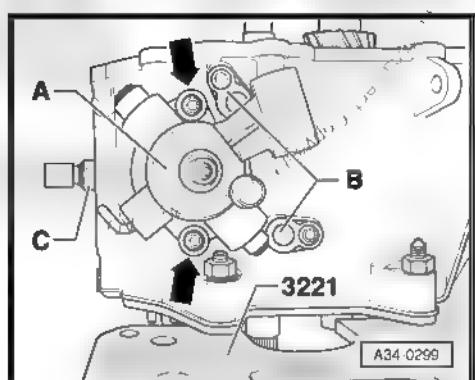
- Remove the pin -1- from the selection fork bearing from 5nd gear -2- selection fork bearing and remove the selection fork
- Remove the circlip -3- and remove the 5 th gear synchronizer
- Remove the circlip -4- and remove the 5nd. gear wheel



- Remove the attaching screws -A- from the primary and pinion shaft bearings
- Remove the hexagonal nut -B- from the selection mechanism (reverse gear fastening).
- Remove the propelling flange fastening screw on left side -C-, by using two screws to lock the flange with a lever.
- Remove propelling flange.
- Place the transmission with the clutch case facing upwards.
- Remove the fastening screws from the clutch.
- Remove the clutch case carefully by leveraging via shoulders around the whole case alternately, without damaging the sealing surfaces.
- Remove differential -A- from the transmission case.



- Loosen the screws -arrows- and remove the selector lever shaft with the selector cover -A-, placing the selector lever shaft in the "idle"
- Remove bearing pins -B- from the upper part of the transmission.
- Remove reverse gear light switch -C-.





- Remove the screw -A- that fastens the reverse gear wheel shaft
- Remove bearing pins -B- on the lower transmission part

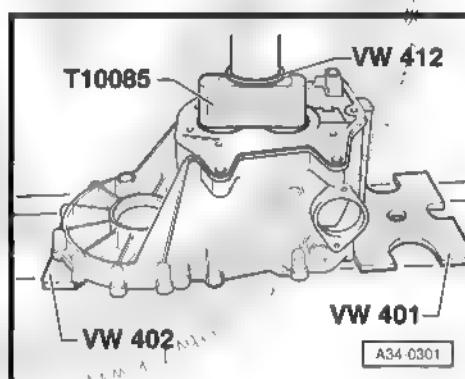
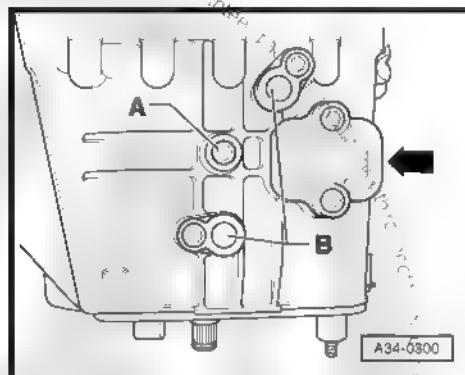
Note

*Do not remove the cover cap arrow- to disassemble the transmission.*

- Install the transmission case over the Thrust plate -VW 401- and Thrust plate -VW 402-, in order that the case adjustment pins are not damaged.
- Remove primary and pinion shafts simultaneously from the roller bearing support, with the selection mechanism (selection fork) and the reverse gear wheel.

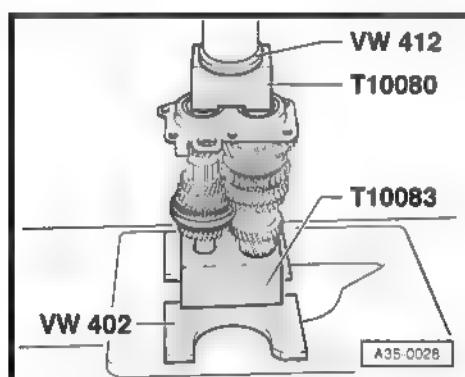
Note

*During pressing, make sure the parts do not fall; if required, ask for help from a second mechanic.*

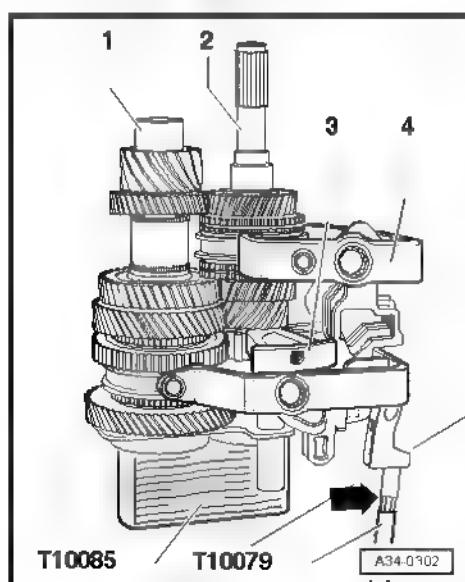


#### 4.6.2 Assembly

- Simultaneously install the primary drive shaft and the pinion on the bearing support using the Pressure shim -T 10083- and Pressure shim -T 10080-.

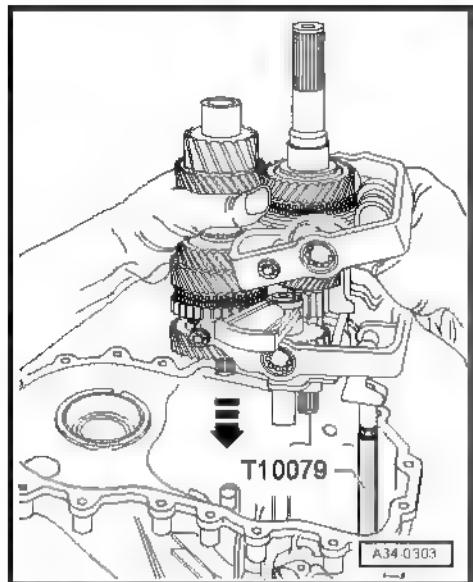


- Install primary shaft -2-, and pinion shaft -1- with the bearing/ball bearing housing on the Thrust pad -T 10085-
- Install the selection mechanism (selection forks) -4- on the shaft engaging sleeves.
- Install the reverse gear wheel shaft -3- with gear.
- Install the Guide pin -T 10079- on threaded pin (reverse gear fastening) -arrow-

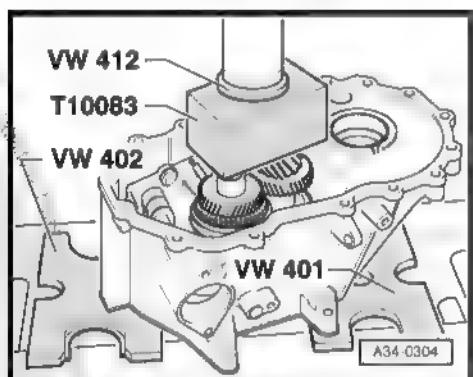




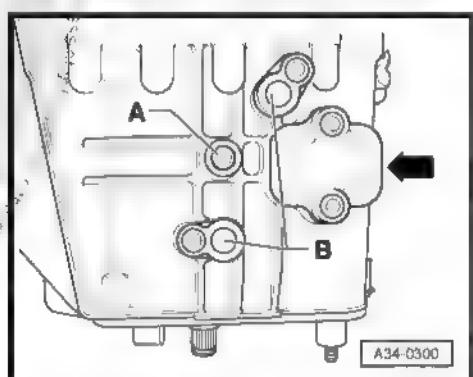
- Install all the components in the gearbox case, by directing the Guide pin -T 10079- into the case through the gearshift mechanism's supporting hole.
- Release Guide pin -T 10079-.
- Before pressing on the roller bearing housing, check the correct fitting of the selection forks on the gearing sleeves.



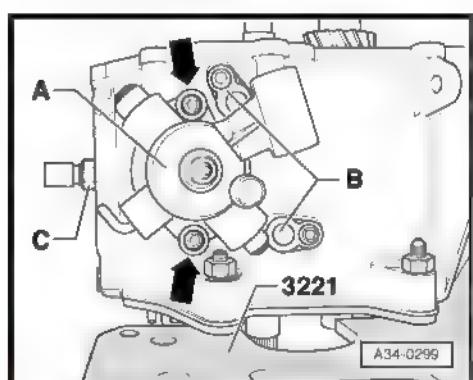
- Press carefully the roller bearing support with the primary and pinion shafts to the stop.



- Install screw -A- on the reverse gear wheel shaft.
- Install bearing pins -B- on the lower transmission part.

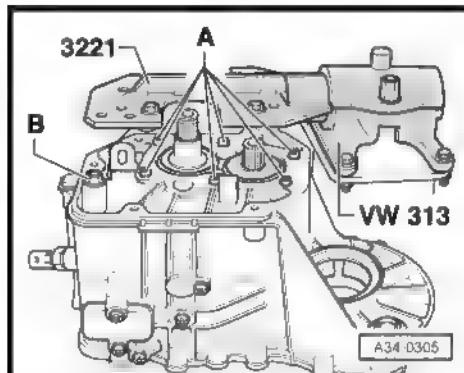


- Install reverse gear light switch -C-.
- Install bearing pins -B- on the upper transmission part.
- Position the selector on "idle".
- Apply Sealing putty -AMV 188 200 03- evenly on the selector cover's surface.
- Install the selector lever shaft with the selector lever cover -A-. Then, tighten screws -arrows- [Item 12 \(page 69\)](#).

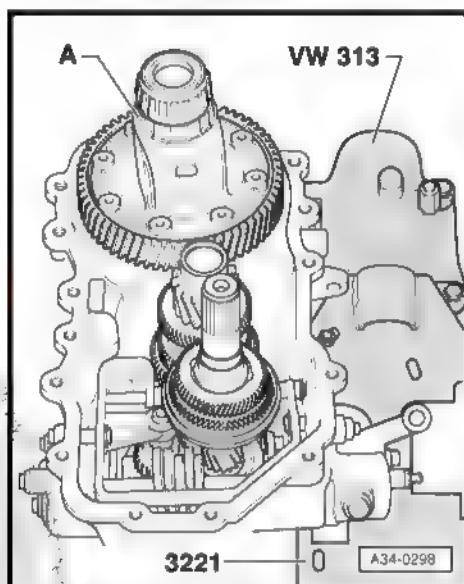




- Install bearing supports on the primary and pinion shafts by using new screws -A- tightening in cross and phased pattern, starting by the middle.
- Install hex nut -B- for the selection mechanism (selection forks).

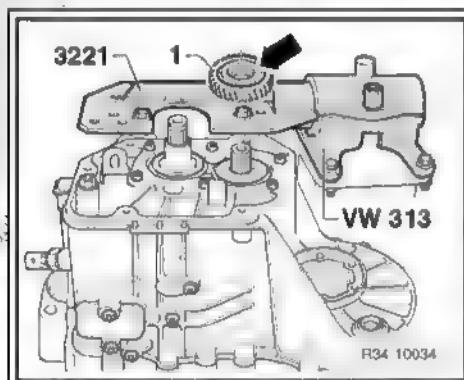


- Install differential -A-.
- Apply Sealing putty -AMV 188 200 03- Evenly on the sealing surface of the transmission case. Refer to the ⇒ Chemical Materials Manual .
- Install the clutch case on the transmission case and tighten screws to the specified tightening torque ⇒ Item 3 (page 68).
- Place the transmission with the clutch case facing upwards.
- Install 5nd. gear -1- with the needle bearing.



#### Installation position of 5nd. gear

- The wide collar -arrow- shall point to the transmission case cover.
- Install the 5nd. gear synchronizer ring on the wheel.
- Install the complete 5nd. gear synchronizer with the gearing sleeve and stop ring.



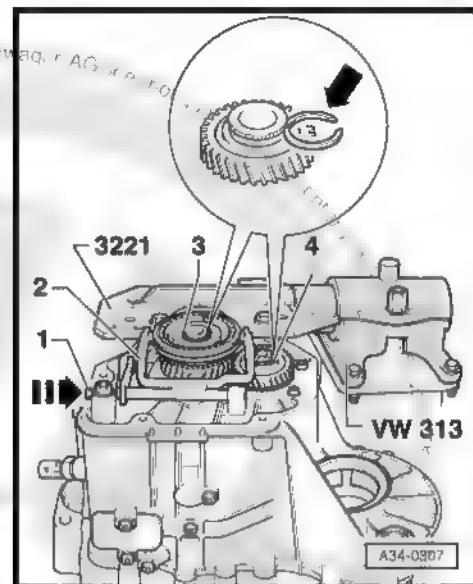


- Install the 5th gear selection fork **nd. gear -2-** and push the bearing pin **-1-** to the stop, towards **-arrow-**.
- Determine the new circlip thickness **-arrow-**
- Identify and install circlip on the primary **3-** and pinion shafts **-4-**.

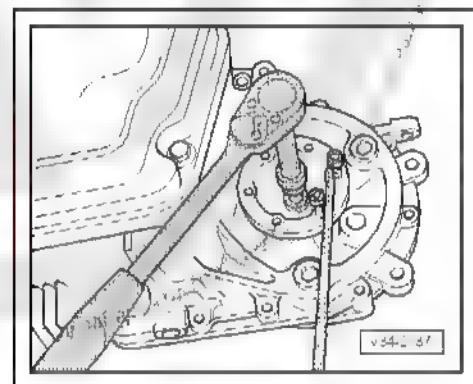
#### Circlips available

Thickness (mm)	Replacement parts No.
2,00	-085 311 187-
2,10	-085 311 187 A-
2,20	-085 311 187 B-

- Install the transmission case cover.



- Install propelling flanges.
- Install clutch lever with bearing and bearing guide [⇒ page 25](#)
- Fill with transmission oil [⇒ page 63](#) .

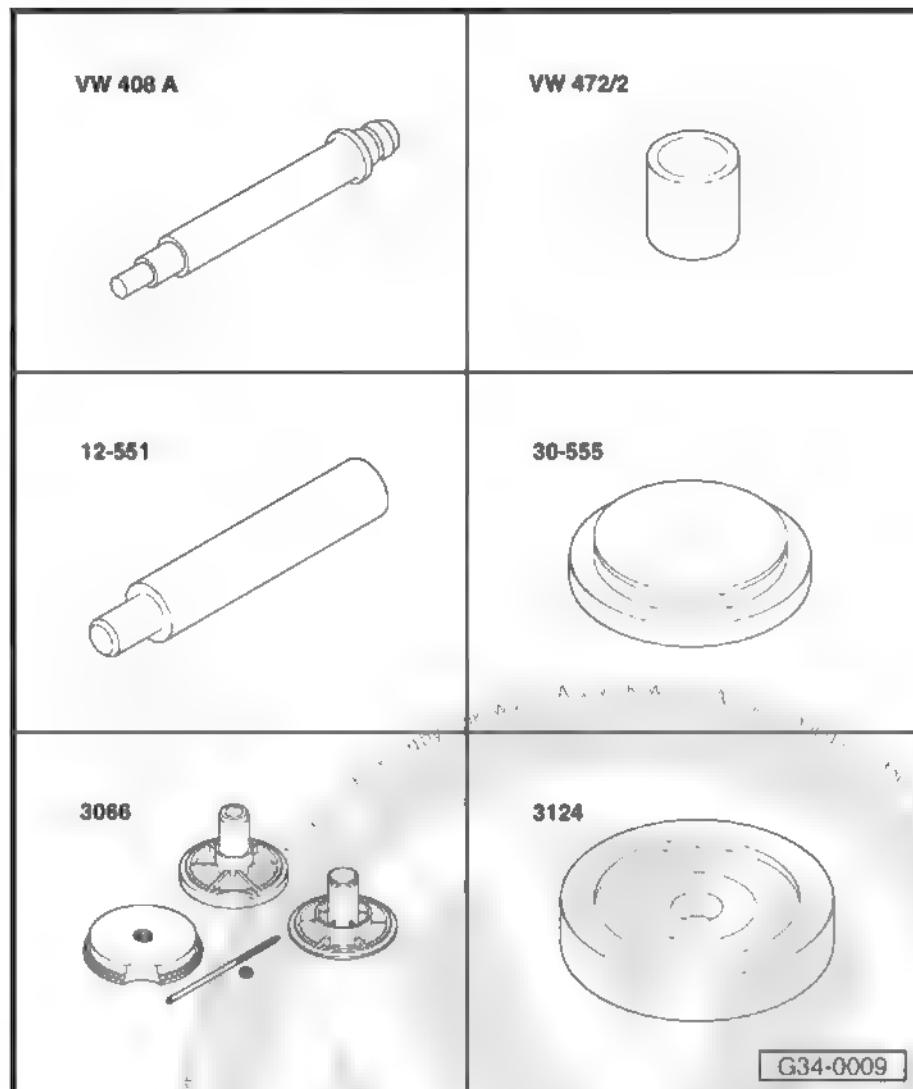




## 5 Transmission and clutch cases - repair

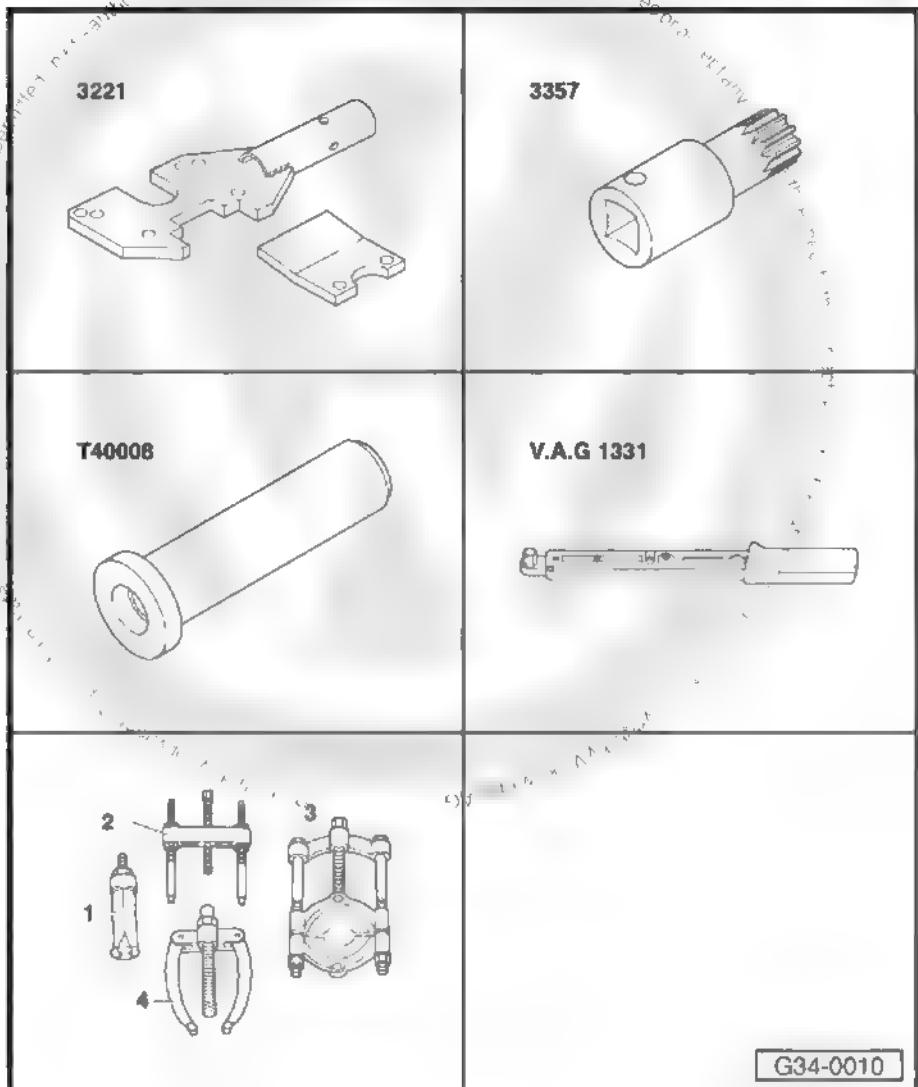
### Special tools and workshop equipment required

- ◆ Pressure pin -VW 408A-
- ◆ Sleeve -VW 472/2-
- ◆ Centering pin -12-551-
- ◆ Pressure Disc -30-555-
- ◆ Mounting device -3066-
- ◆ Pressure plate -3124-





- ◆ Support -3221-
- ◆ Multi-teeth socket SW 27 -3357-
- ◆ Pressure tube -T 40008-
- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331
- ◆ -2- Extractor 65 - 160 mm - KUKKO 18/1-
- ◆ -3- Spacer 12 - 75 mm - KUKKO 17/1-



G34-0010



1 - Clutch case

- Manufactured in aluminum or magnesium.
- Allocation ⇒ Electronic Parts Catalogue (ET-KA).
- Repair ⇒ [page 78](#).
- Whenever replaced, adjust the differential ⇒ [page 122](#).

2 - Sealing ring for primary shaft

- Remove by leveraging with screwdriver.
- Installation ⇒ [page 82](#)

3 - Ball pin

- 20 Nm.
- Lubricate with grease, consult the ⇒ Chemical Materials Manual.

4 - Sealing ring for the right propelling flange

- Replace with the transmission installed ⇒ [page 109](#).

5 - Bushing

- For the sealing ring.
- Removal ⇒ [page 82](#).
- Installation ⇒ [page 82](#)

6 - Oil filling plug

- 25 Nm.
- Using Multi-teeth socket SW 27 -3357- to remove and install.

7 - O-ring

- Replace whenever removed.

8 - Speed sensor -G22-

9 - Screw

- 5 Nm + 90°.
- Replace whenever removed.

10 - Adjustment shim S<sub>2</sub>

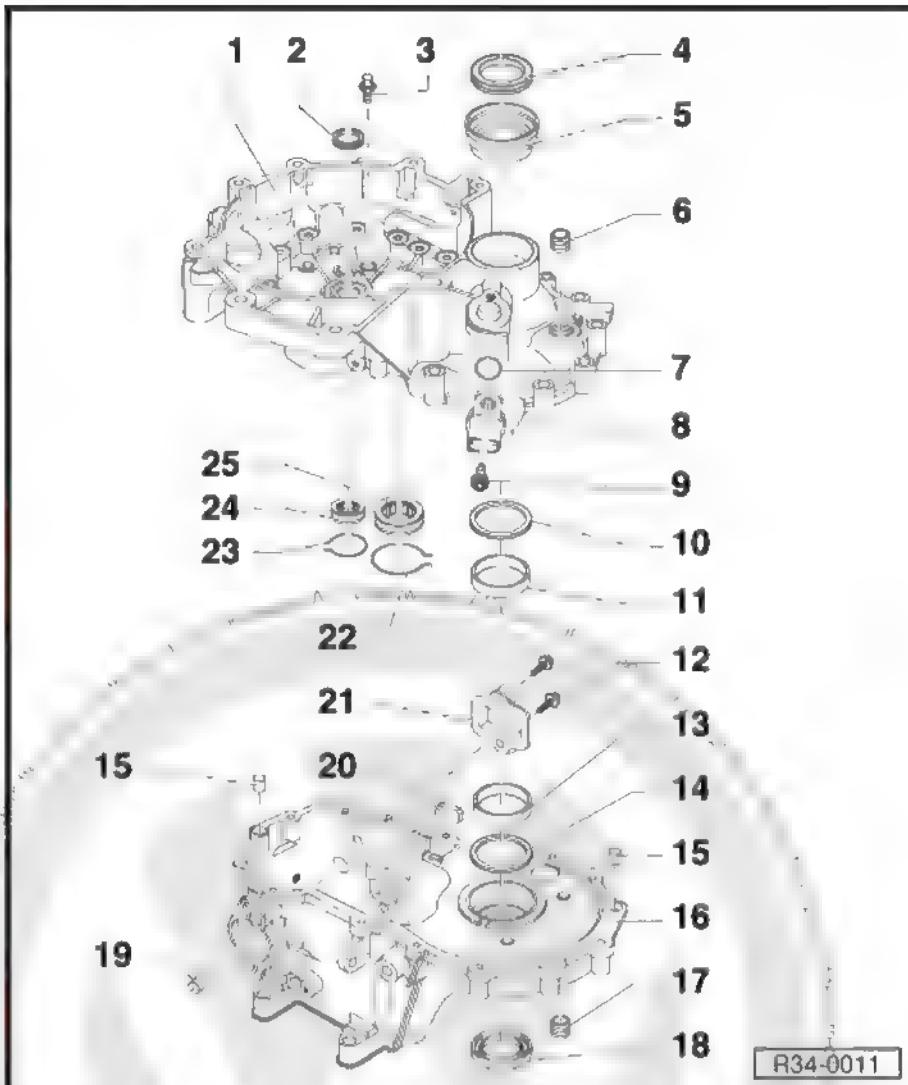
- For the differential.
- Determine thickness ⇒ [page 122](#).

11 - Outside ring on the tapered roller bearing

- For the differential.
- Remove ⇒ [page 119](#)
- Install ⇒ [page 119](#)
- Whenever replaced, adjust the differential ⇒ [page 122](#).

12 - Screw

- 5 Nm + 90°.
- Replace whenever removed





13 - Outside ring on the tapered roller bearing

- For the differential.
- Remove [⇒ page 118](#)
- Install [⇒ page 119](#)
- Whenever replaced, adjust the differential [⇒ page 122](#).

14 - Adjustment shim S1

- For the differential.
- Always with 1-mm thickness.

15 - Adjustment pin

- 2 units.

16 - Transmission case

- Manufactured in aluminum or magnesium.
- Allocation ⇒ Electronic Parts Catalogue (ETKA).
- Repair [⇒ page 78](#).
- Whenever replaced, adjust the differential [⇒ page 122](#).
- Apply the Sealing putty -AMV 188 200 03- Evenly on the sealing surface of the transmission case.

17 - Oil draining plug

- 25 Nm.

18 - Sealing ring for the left propelling flange

- Replace with the transmission installed [⇒ page 109](#).

19 - Bushing

- For the selector lever shaft
- Removal [⇒ page 82](#)
- Installation [⇒ page 83](#)

20 - Magnet

- Fastened on the case surface.

21 - Reservoir lid

- Apply the Sealing putty -AMV 188 200 03- evenly on the sealing surface before installing. Refer to the ⇒ Chemical Materials Manual.

22 - Circlip

- Install on the tapered roller bearing groove [⇒ Item 25 \(page 81\)](#).

23 - Circlip

- Install on the tapered roller bearing groove [⇒ Item 24 \(page 81\)](#).

24 - Tapered roller bearing

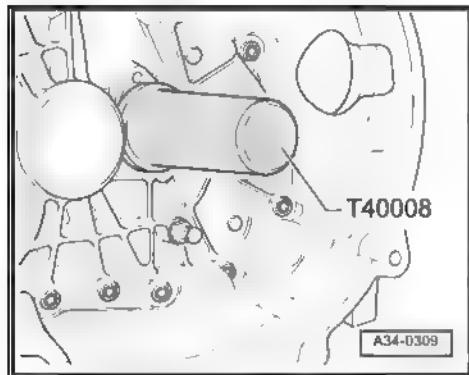
- For primary shaft
- Removal [⇒ page 95](#)
- Installation [⇒ page 95](#)

25 - Tapered roller bearing

- For pinion shaft.
- Removal [⇒ page 104](#)
- Installation [⇒ page 104](#)

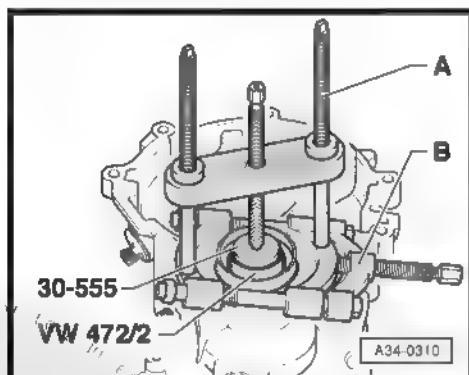


### Installing the primary shaft's sealing ring



### Removing the sealing ring bushing

- Sleeve -VW 472/2- and Pressure Disc -30-555-, install on the differential.
- A - Extractor 65 - 160 mm -KUKKO 18/1-
- B - Spacer 12 - 75 mm -KUKKO 17/1-

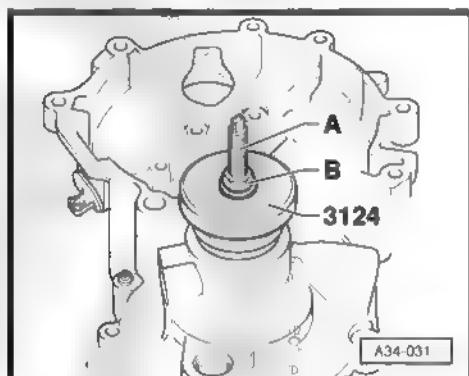


### Installing the sealing ring bushing

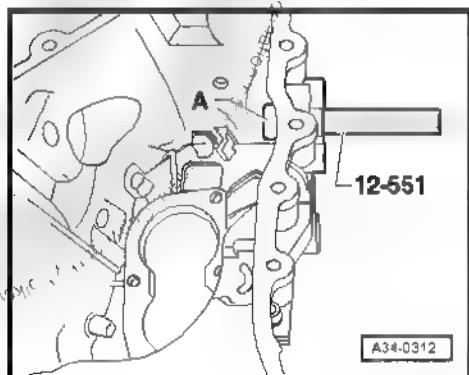
- A - Fasten the threaded shaft of the Mounting device -3066- to the threaded part in the differential
- B - M12 nut with washer
- Install the bushing to the stop with Pressure plate -3124- ,by turning nut -B-.



*With the transmission disassembled, press the bushing with Pressure plate -3124- to the stop.*

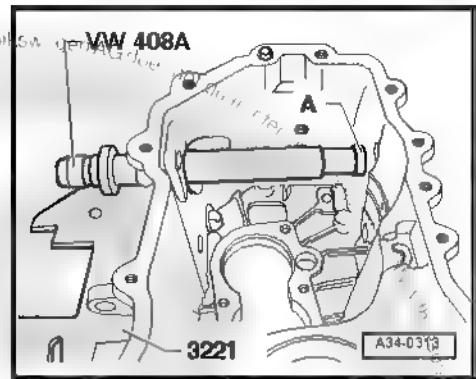


### Removing the bushing for the selector lever shaft -A-





Installing the bushing for the selector lever shaft -A-

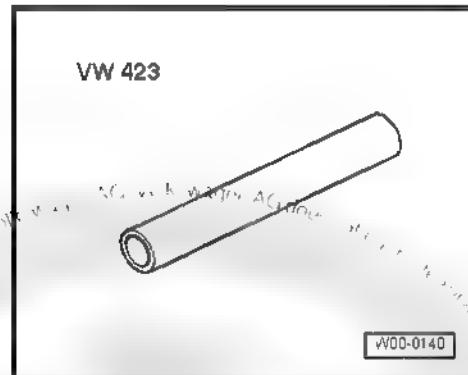




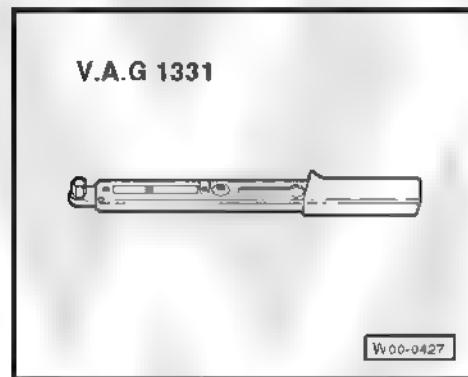
## 6 Gear selection mechanism - disassemble and assemble

Special tools and workshop equipment required

- ◆ Pressure tube -VW 423-



- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-



General overview of assembly :



**1 - Bushing**

- For the selector lever shaft
- Remove [page 82](#)
- Install [page 83](#)

**2 - Selector lever shaft with selector cover**

- Replace as a set

**3 - Inversion lever**

- Installation position  
[page 29](#)

**4 - Bearing bushing**

**5 - Seal ring**

- Remove by using a screwdriver
- Install [page 85](#)

**6 - Cover**

- For the transmission venting tube

**7 - Transmission selector lever**

- Install in order that the grooves are aligned with those on the selector lever shaft
- Can be replaced with the selection mechanism installed
- Installation position  
[page 29](#).

**8 - Hexagon nut**

- Self-locking
- $20 \pm 2 \text{ Nm}$
- Replace whenever removed

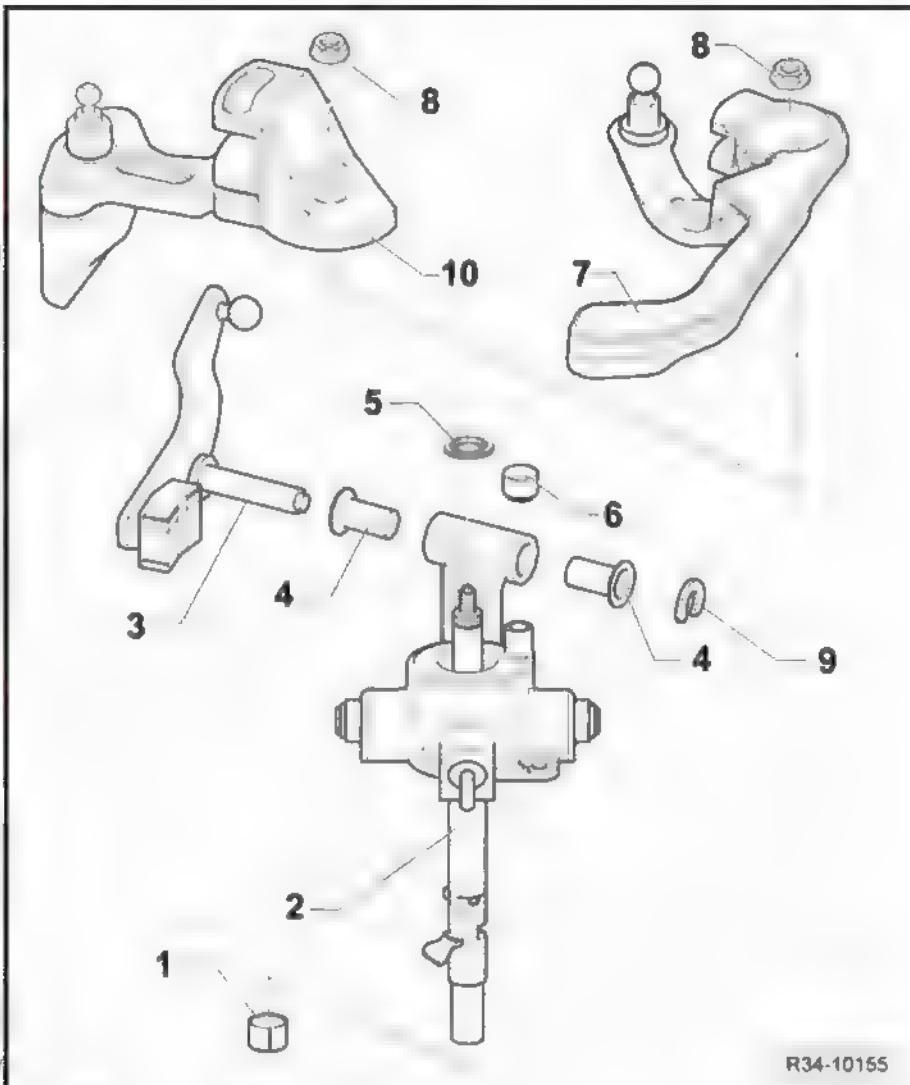
**9 - Safety lock**

**10 - Transmission selector lever**

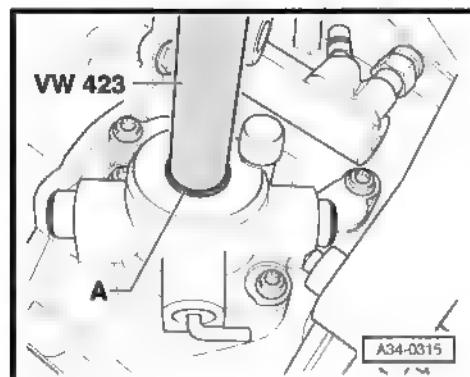
- Install in order that the grooves are aligned with those on the selector lever shaft
- Can be replaced with the selection mechanism installed
- Installation position [page 31](#).

**Installing sealing ring**

- Install new sealing rings -A- to the stop, using the Pressure tube -VW 423- .



R34-10155



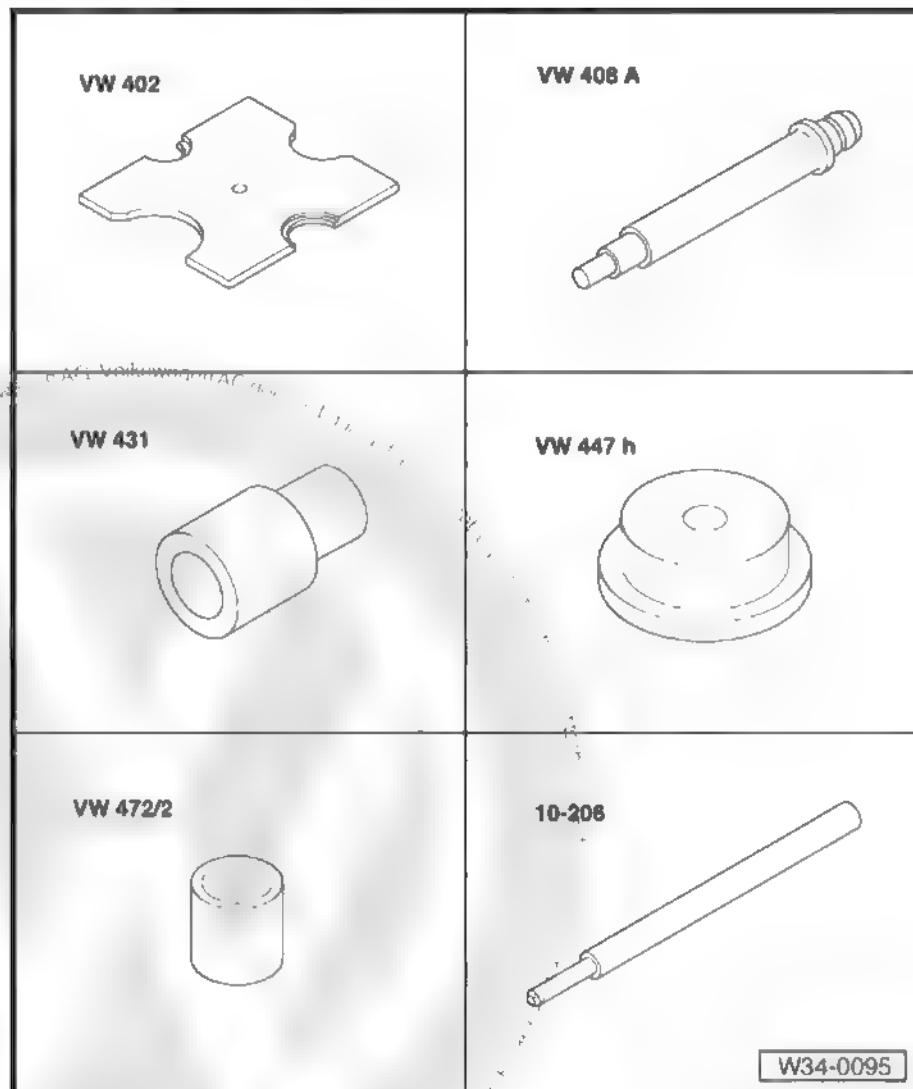
A34-0315



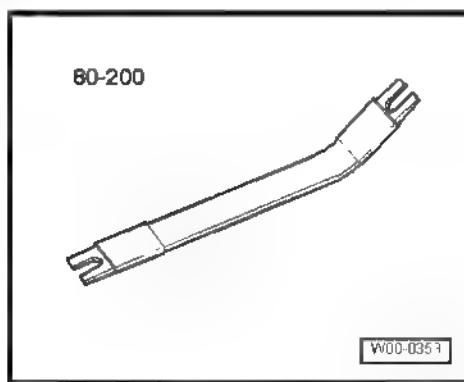
## 7 Selection forks - disassemble and assemble

Special tools and workshop equipment required

- ◆ Thrust plate -VW 402-
- ◆ Pressure pin -VW 408A-
- ◆ Thrust pad -VW 431-
- ◆ Thrust pad -VW 447H-
- ◆ Sleeve -VW 472/2-
- ◆ Pin or VW 010-206  
-10-206-



- ◆ Ejector lever -80-200-



Note

To remove or install the selector segments (skids), circlips and ball bearings, you are not required to remove the change rail set.



1 - Change rail set with selector forks

2 - Selector segment 3rd./  
4th. gears

- Identification  
⇒ [page 88](#)
- After assembling, it shall move freely.
- Individual selector segments are mounted in some transmissions  
⇒ [page 88](#)
- Identification of individual segments  
⇒ [page 88](#)

3 - Ball bearing

- 4 units.
- Removal ⇒ [page 89](#)
- Installation ⇒ [page 89](#)

4 - Circlip

- Renew whenever removed.
- Removal ⇒ [page 89](#)
- Installation ⇒ [page 89](#)

5 - Selector segment 1nd./  
2nd. gears

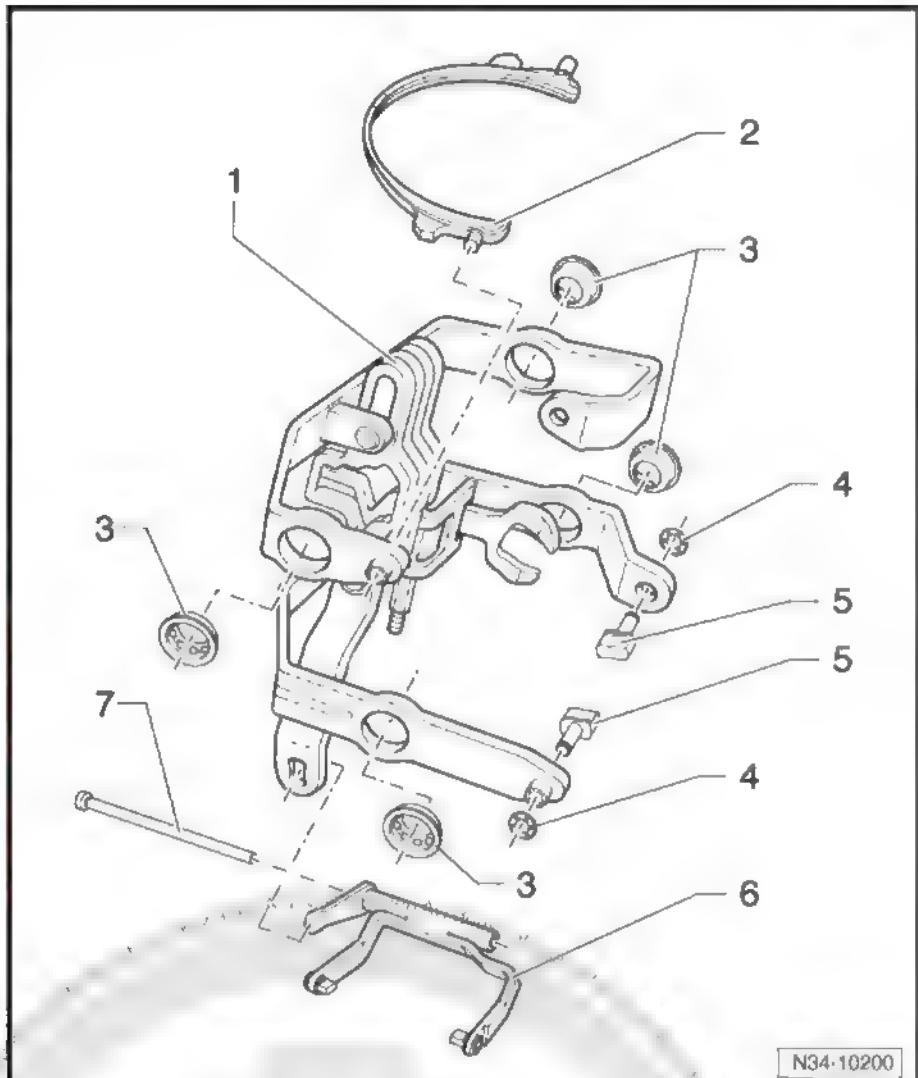
- Identification  
⇒ [page 88](#)
- After assembling, it shall move freely.

6 - Selector fork for 5nd. gear  
with selector segment

- The selector segments should not be removed from the selector fork.
- Identification ⇒ [page 88](#)

7 - Bearing pin

- For the selector fork for 5nd. gear wheel.



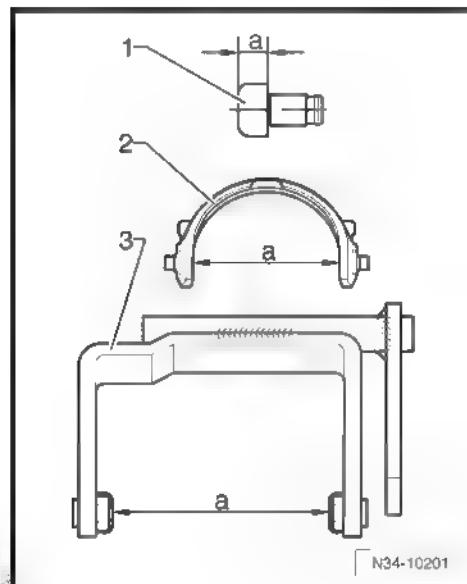
N34-10200



Identification of selector segments of 5th forknd. gear including selector segments of 1nd./2nd. gears and 3nd./4nd. gears

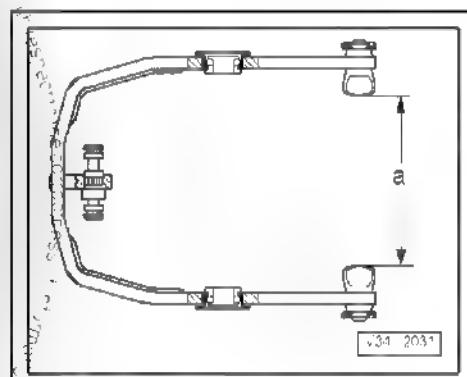
Measurement -nd- = 75 mm

- 1 - Selector segments 1nd./2nd. gears = 10.2 mm
- 2 - Selector segment 3nd./4nd. gears = 78.6 mm
- 3 - Selector fork for 5nd. gear, including the selector segments = 79.5 mm



Selector fork for 1nd./2nd. gears including the selector segments

Measurement -nd- = 75 mm



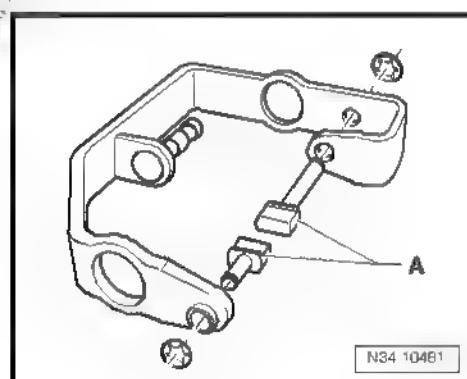
Individual selector segments 3nd./4nd. gears -A-

After assembling the gear selector segments, they shall move freely.



Note

*Only some transmissions have these individual segments.*



Identification of the individual selector segments for 3nd./4nd. gears

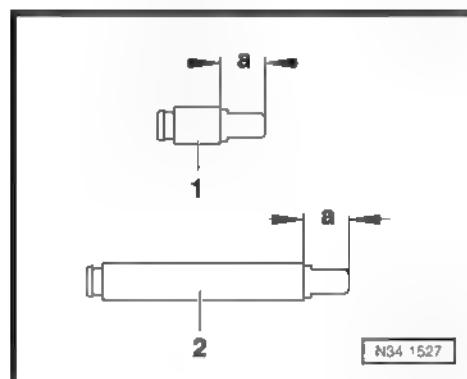
Measurement -nd-:

- 1 - Short selector segment 3nd./4nd. gears = 10.2 mm
- 2 - Long selector segment 3nd./4nd. gears = 10.2 mm



Note

*When removing or installing internal tracks, do not twist the selection forks*

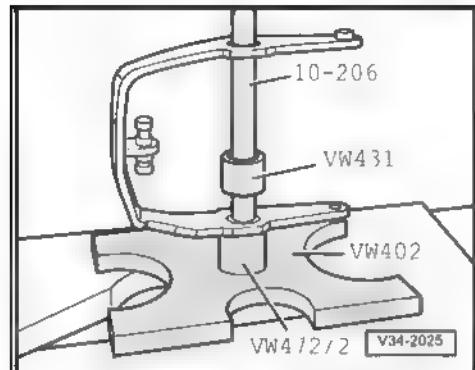




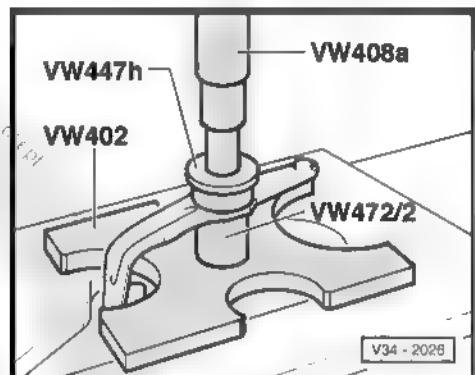
## Removing ball bearing



*When removing or installing internal tracks, do not twist the selection forks*

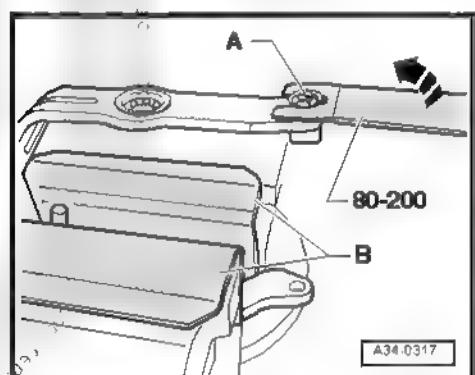


## Ball bearing - install



## Removing circlip

- Fasten the selection forks to the vise with jaw -B-.
- Remove the circlip -A- by leveraging towards -arrow-.



## Installing circlip

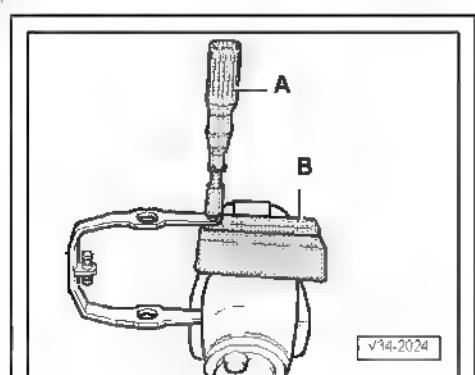
A - Barrel wrench 10

B - Jaw

- Press the circlip on the fork segment groove by using a barrel wrench.



*After installing the circlip, the fork segment shall move freely*



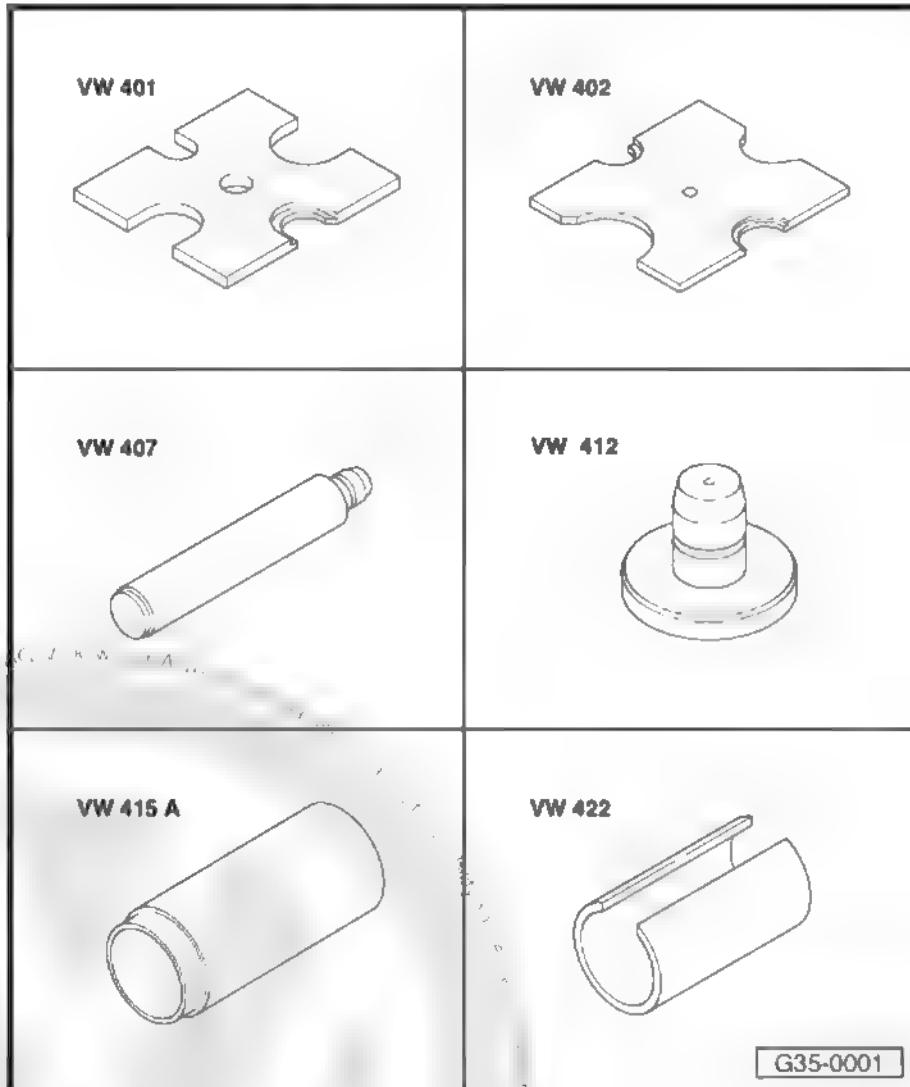


## 35 – Gears and shafts

### 1 Primary shaft - disassemble and assemble

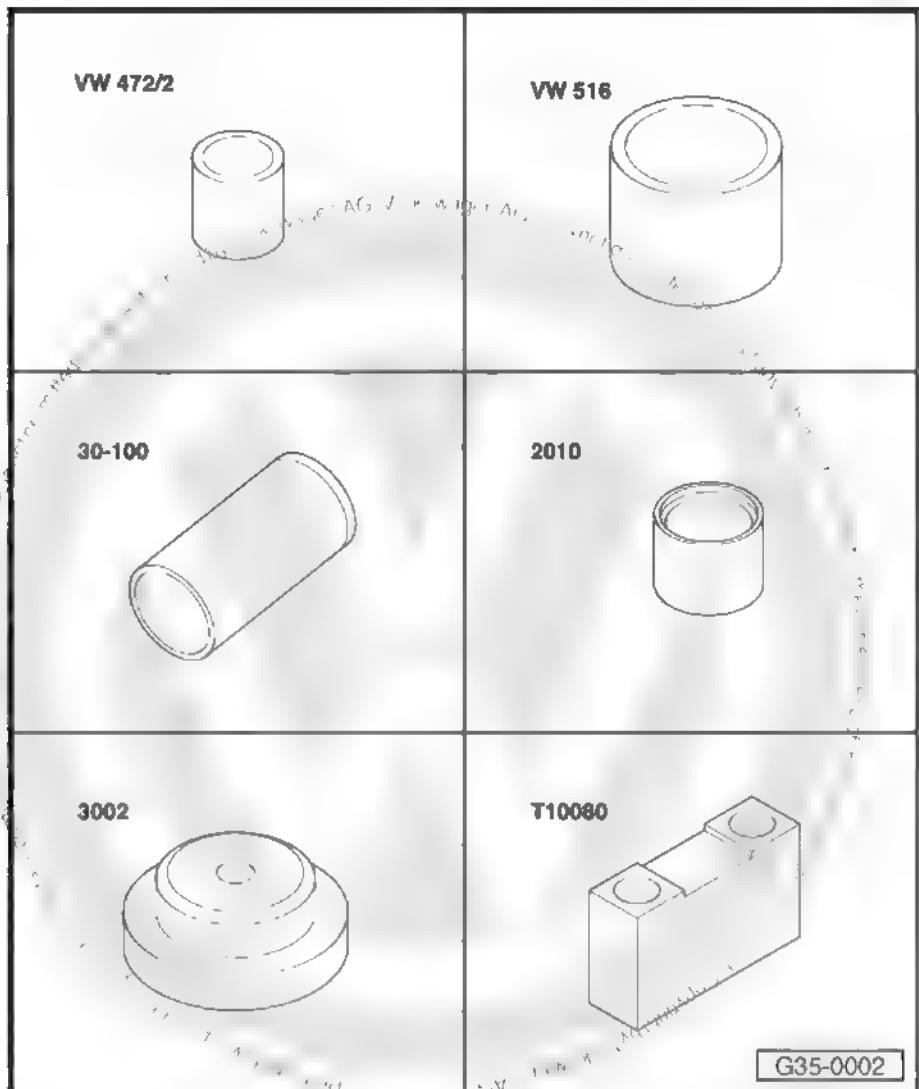
Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Pressure pin -VW 407-
- ◆ Pressure Disc -VW 412-
- ◆ Pressure tube -VW 415A-
- ◆ Pressure tube -VW 422-



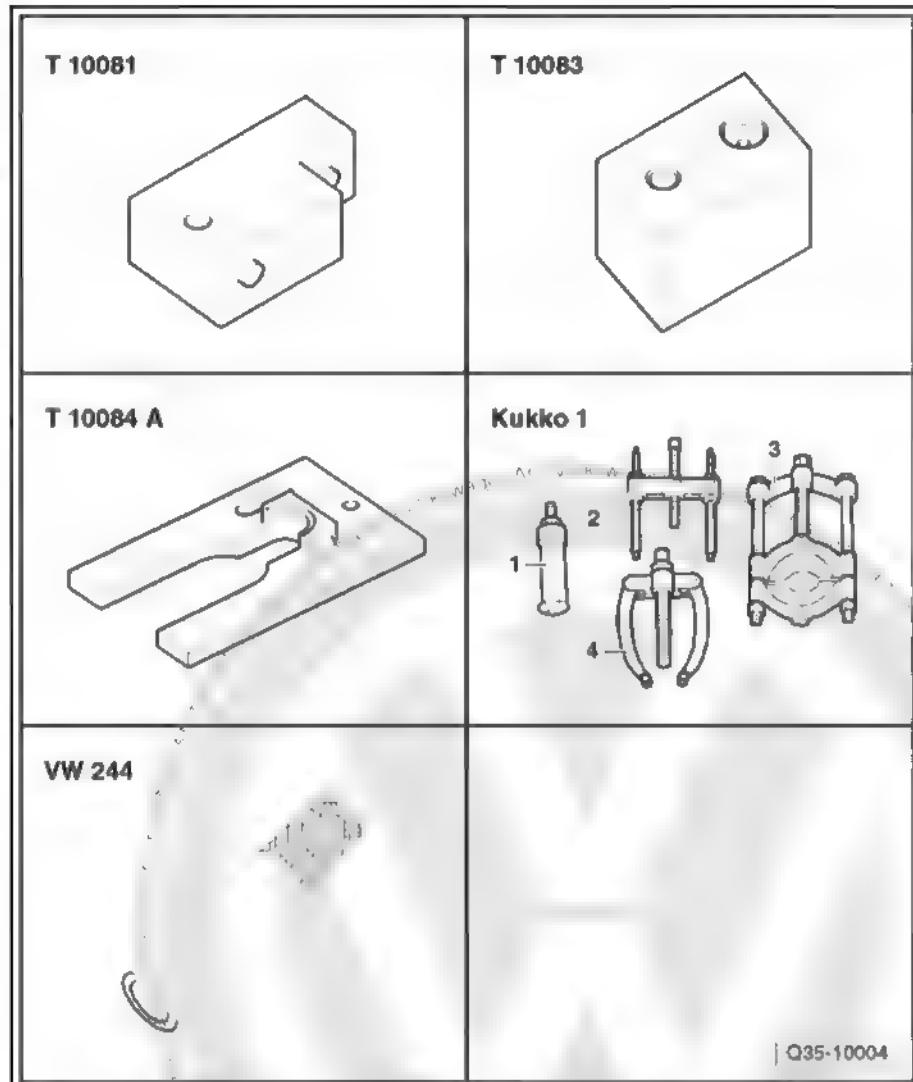


- ◆ Sleeve -VW 472/2-
- ◆ Tube -VW 516-
- ◆ Tube -30-100-
- ◆ Tube -2010-
- ◆ Pressure base or VW 3002  
-3002-
- ◆ Pressure shim -T 10080-





- ◆ Pressure shim -T 10081-
- ◆ Pressure shim -T 10083-
- ◆ Pressure plate -T 10084A-
- ◆ -1- Puller 30 - 37 mm or VW 020P -Kukko 21/5-
- ◆ -2- Extractor 65 - 160 mm - KUKKO 18/1-
- ◆ -3- Spacer 12 - 75 mm - KUKKO 17/1-
- ◆ -4- Auxiliary support -KUKKO 22/1-
- ◆ Fitting tool -VW 244-



#### Note

- ◆ When installing new gears, refer to technical data ➡ [page 1](#).
- ◆ Install all the roller bearings, gears and synchronizer rings <sup>on</sup> the primary shaft, lubricated with gear oil.
- ◆ Do not invert the synchronizer rings. When reusing synchronizer rings, always install them on the same gear pair



### 1 - Circlip

- Renew whenever removed.
- Determine thickness ➔ [page 77](#).

### 2 - Engaging sleeve with 5nd-gear

- Disassemble and assemble ➔ [page 99](#)

### 3 - Synchronizer ring for 5nd-gear

- Wear check ➔ [page 97](#)

### 4 - Gear for the 5nd. gear

### 5 - Needle roller bearing

- For the 5nd. gear wheel.
- Change with bushing ➔ [Item 6 \(page 93\)](#).

### 6 - Bushing

- For the 5 th gear needle bearingnd. gear wheel.
- Change with roller bearing ➔ [Item 5 \(page 93\)](#).
- Remove with ball bearing support ➔ [page 95](#)
- Installation ➔ [page 98](#)

### 7 - Transmission case

- Manufactured in aluminum or magnesium
- Allocation ➔ Electronic Parts Catalogue (ETKA)
- Repair ➔ [page 78](#)
- In case of replacement, always adjust differential ➔ [page 122](#)
- Apply the Sealing putty -AMV 188 200 03- Evenly on the sealing surface of the transmission case. Refer to the ➔ Chemical Materials Manual

### 8 - Roller bearing support with ball bearing

- Change roller bearing support with ball bearing.
- Clean the threaded holes of the roller bearing support (e.g. Tap M6).
- Removal ➔ [page 95](#)
- Installation ➔ [page 98](#)

### 9 - Primary shaft

### 10 - Needle roller bearing

- For the 3nd. gear wheel.

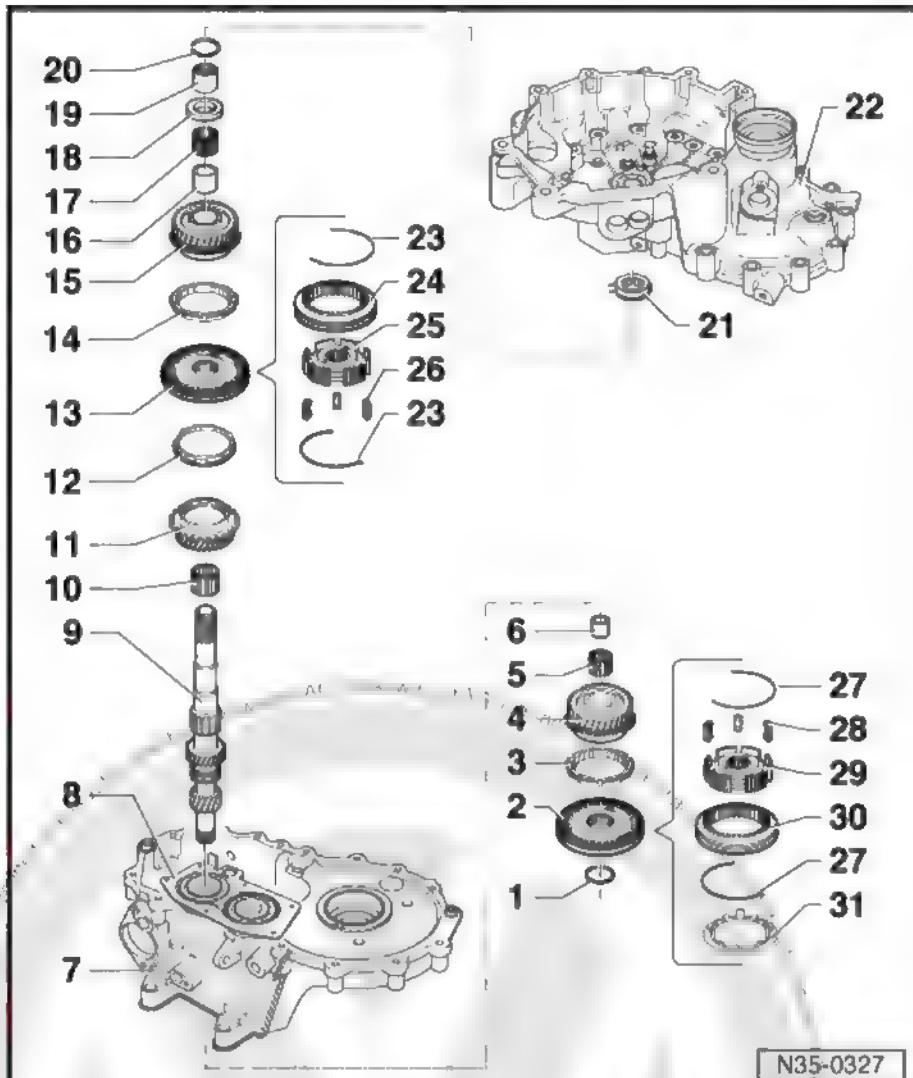
### 11 - Gear for the 3nd. gear

### 12 - Synchronizer ring for 3nd. gear

- Wear check ➔ [page 97](#)

### 13 - Engaging sleeve with 3nd. and 4nd. gears

- Remove with 3nd. gear ➔ [page 96](#)
- Disassemble and assemble ➔ [page 96](#)



N35-0327



- Installation position of the engaging sleeve/synchronizer ring [⇒ page 96](#)
- Installation [⇒ page 97](#)

#### 14 - Synchronizer ring for 4nd. gear

- Wear check [⇒ page 97](#)

#### 15 - Gear for the 4nd. gear

#### 16 - Bushing

- For 4 th gear needle roller bearingnd. gear wheel.
- Change with needle roller bearing [⇒ Item 17 \(page 94\)](#).
- Remove with 3nd. gear [⇒ page 95](#)
- Installation [⇒ page 97](#)

#### 17 - Needle roller bearing

- For the 4nd. gear wheel.
- Change with bushing [⇒ Item 16 \(page 94\)](#).

#### 18 - Sealing washer

#### 19 - Inside ring on the tapered roller bearing

- Removal [⇒ page 95](#)
- Installation [⇒ page 97](#)

#### 20 - Circlip

- Replace.
- Thickness determination [⇒ page 98](#)

#### 21 - Tapered roller bearing

- With circlip.
- Removal [⇒ page 95](#)
- Installation [⇒ page 95](#)
- Installation position: the bearing lock ring shall point to the input shaft

#### 22 - Clutch case

- Manufactured in aluminum or magnesium
- Allocation ⇒ Electronic Parts Catalogue (ETKA)
- Repair [⇒ page 78](#)
- In case of replacement, always adjust differential [⇒ page 122](#)
- Apply the Sealing putty -AMV 188 200 03- Evenly on the sealing surface of the transmission case.

#### 23 - Spring

- Installation position [⇒ page 96](#)

#### 24 - Engaging sleeve with 3nd. and 4nd. gears

#### 25 - Synchronizer ring for 3nd. and 4nd. gears

#### 26 - Retainers

- 3 units

#### 27 - Spring

- Installation position [⇒ page 99](#)

#### 28 - Retainers

- 3 units

#### 29 - Synchronizer of 5nd. gear

#### 30 - Engaging sleeve with 5nd. gear

#### 31 - Stop ring

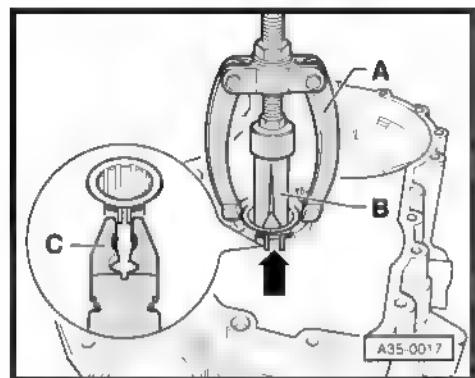
- Prevent limiter "escape" of the locking pieces.



- Removal → [page 99](#)
- Installation → [page 100](#)

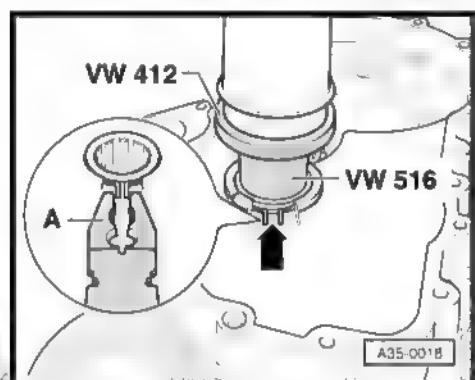
#### Removing tapered roller bearing on clutch case

- A - Auxiliary support -KUKKO 22/1-
- B - Puller 30 - 37 mm or VW 020P -Kukko 21/5-
- When removing it, compress the bearing circlip -arrow- with pliers -C-.



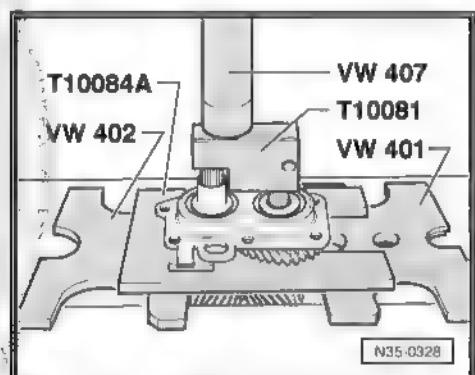
#### Installing tapered roller bearing on clutch case

- Support the clutch case by placing the Pressure tube -VW 415A- (does not appear in the pic.) directly under the bearing bracket.
- When installing, compress the bearing circlip -arrow- with pliers -A-.
- Remove the pliers just before the bearing is in the correct installation position. The circlip shall be locked in the clutch case hole.



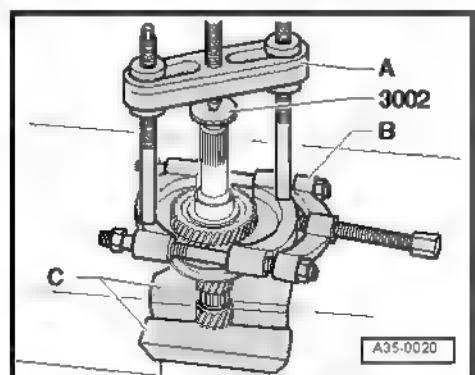
#### Removing the bearing support with ball bearings

- Engage the 2nd. gear wheel.
- Push Pressure plate -T 10084A- laterally to the primary shaft stop.
- Install centering pins of the Pressure shim -T 10081- on the primary and pinion shaft holes.



#### Removing the inside ring of the tapered roller bearing with the 4nd. gear

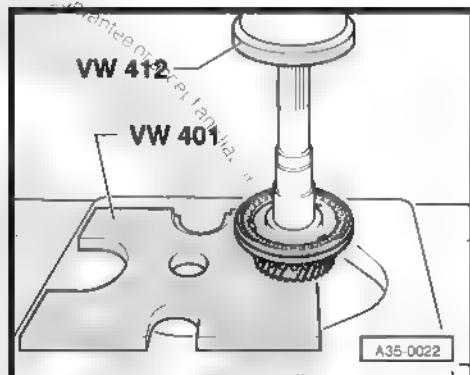
- A - Extractor 65 - 160 mm -KUKKO 18/1-
- B - Spacer 12-75 mm -KUKKO 17/1-
- C - Protection shims
- Remove circlip first
  - Fasten the Spacer 12 - 75 mm -KUKKO 17/1- -B- behind the helical teeth (not in the gear teeth) of 4nd. gear wheel.





### Engaging sleeve with synchronizer of 3rd. and 4nd. gears

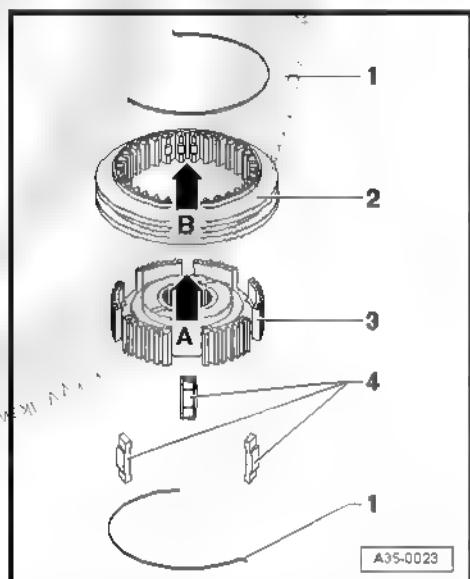
- Disengage together with the moving wheel of 3nd. gear and the engaging sleeve with synchronizer



### Disassembling and assembling the 3rd gear engaging sleeve and synchronizer of 3rd. and 4nd. gears

- 1 - Spring
  - 2 - Engaging sleeve
  - 3 - Synchronizer
  - 4 - Retainers
- Press the engaging sleeve on the synchronizer.

The deeper grooves -arrow A- for the limiters located on the synchronizer shall match the notches -arrow B- on the engaging sleeve.

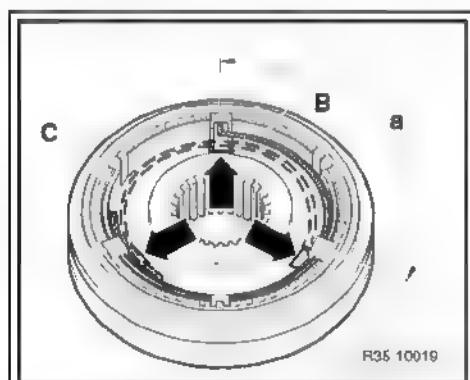


- Install the limiters in the deeper grooves -arrows-.
- Press the engaging sleeve on the synchronizer
- Install springs -B- and -C- displaced by -nd-



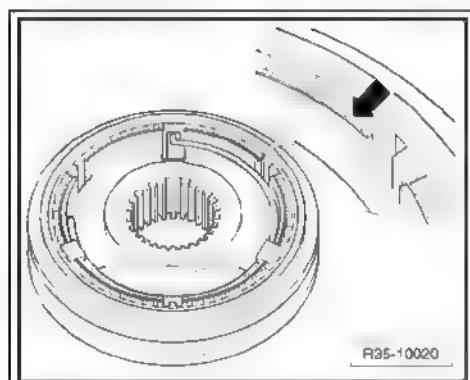
-nd- = 120°

- The folded end of the spring shall fit into the limiter's hole.



### Installation position locking collar/synchro hub of 3nd. and 4nd. gears

The front face notch -arrow- shall face the 4nd. gear wheel

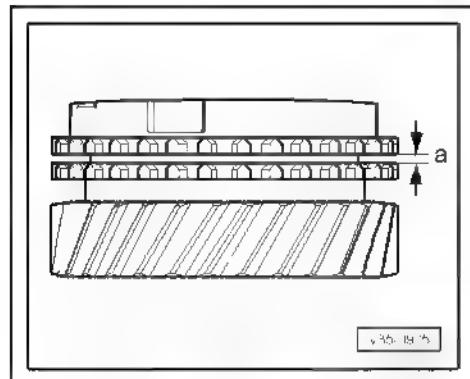




#### Checking the wear on the synchronizer ring

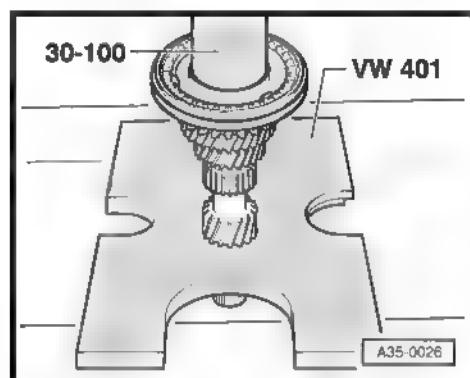
- Press the synchronizer ring against the gear cone and measure the distance -nd- with a feeler gauge

Distance -nd-	New part	Wear limit
3rd., 4rd. and 5rd. gears	1.1..1.7 mm	0.5 mm



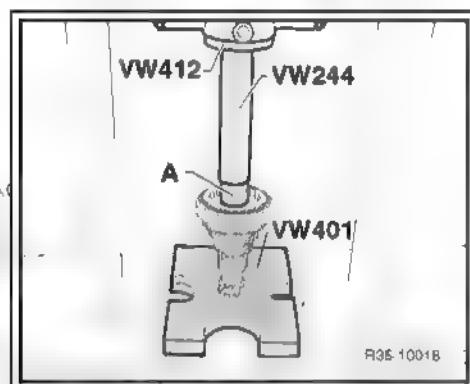
#### Installing synchronizer with the engaging sleeve of 3rd. and 4rd. gears

- When pressing, secure the 3rd. wheel gear with the synchronizer ring fitted in the engaging sleeve/synchronizer of the 3rd. and 4rd. gears.

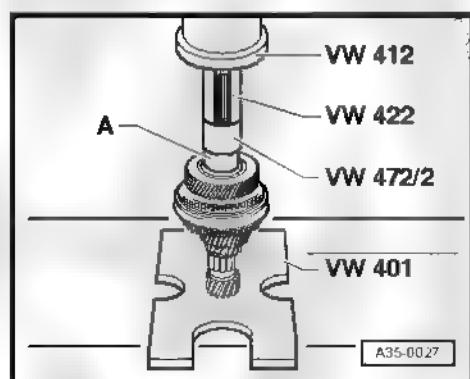


#### Installing the bushing on the needle bearing of 4rd. gear -A-

- Install 4rd. gear wheel.



#### Installing the inside ring on the tapered roller bearing -A-





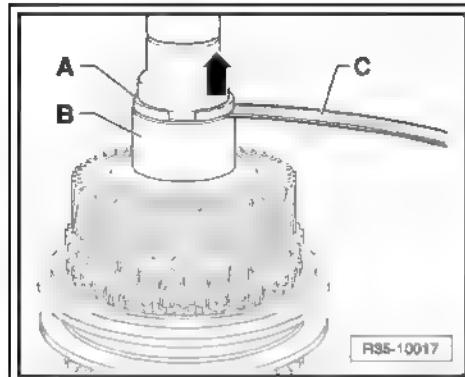
#### Determination of the circlip thickness

- Install a circlip with 2.0 mm thickness -A- in the primary shaft groove and press upwards -arrow-
- Determine the distance between the inside ring -B- and the circlip installed -A- using a blade gauge -C-.
- Remove the circlip used for measurement.
- Use the table to determine the circlip to be installed.



Note

Request circlips by ⇒ *Electronic Parts Catalogue (ETKA)*.

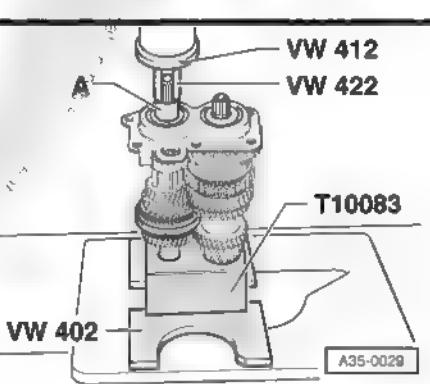
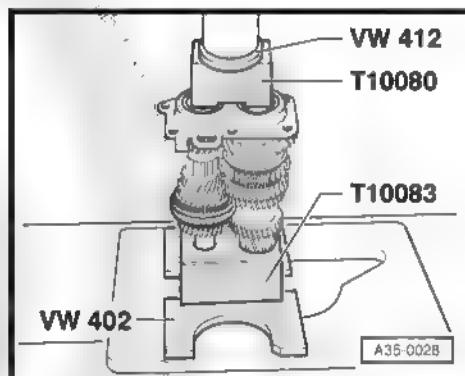


R35-10017

#### Circlips available

Value measured (mm)	Circlip thickness (mm)	Axial clearance (mm)
0,05 ... 0,10	2,0	0,05 ... 0,15
0,15 ... 0,20	2,1	0,05 ... 0,15
0,25 ... 0,30	2,2	0,05 ... 0,15
0,35 ... 0,40	2,3	0,05 ... 0,15
0,45 ... 0,50	2,4	0,05 ... 0,10

#### Installing the bearing support with ball bearings

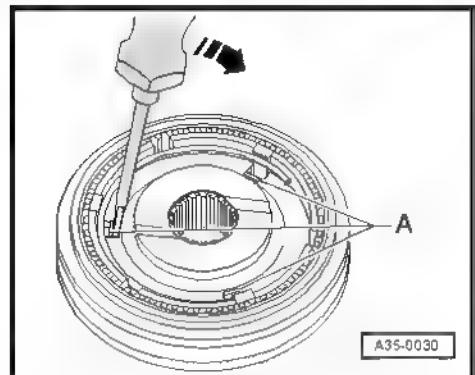


#### Installing the bushing -A- for 5 th gear needle roller bearingnd. gear



### Removing the stop ring

- Disengage hooks -A- from the stop ring with a screwdriver



### Disassembling and assembling the 5th gear engaging sleeve and synchronizer 5nd. gear

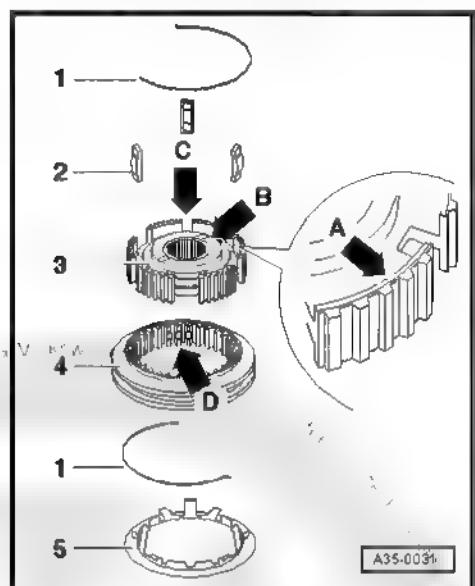
- 1 - Spring
- 2 - Retainers
- 3 - Synchronizer

- Installation position: the front face groove -arrow A- and the wide collar -arrow B- shall face the 5nd. gear wheel.

- 4 - Engaging sleeve
- 5 - Stop ring

- Press the engaging sleeve on the synchronizer.

The deeper grooves -arrow C- for the limiters located on the synchronizer shall match the notches -arrow D- on the engaging sleeve.



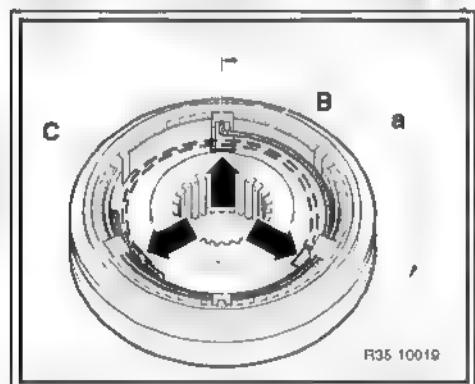
- Install the limiters in the deeper grooves -arrows-.
- Press the engaging sleeve on the synchronizer
- Install springs -B- and -C- displaced by -nd-



Note

-nd- = 120°

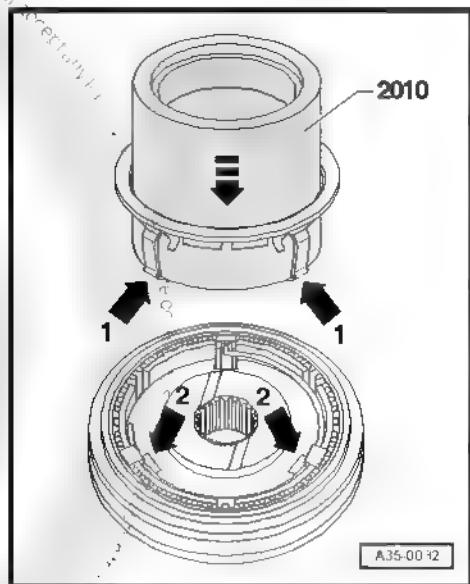
- The folded end of the spring shall fit into the limiter's hole.





#### Installing stop ring

- Fit the ring in Tube -2010- .
- Introduce the Tube -2010- with the synchronizer for 5nd. gear observing correct installation position. The hooks -arrow 1- shall fit in the notches -arrow 2- of the synchronizer limiters
- Press the stop ring downwards until locking the hooks.



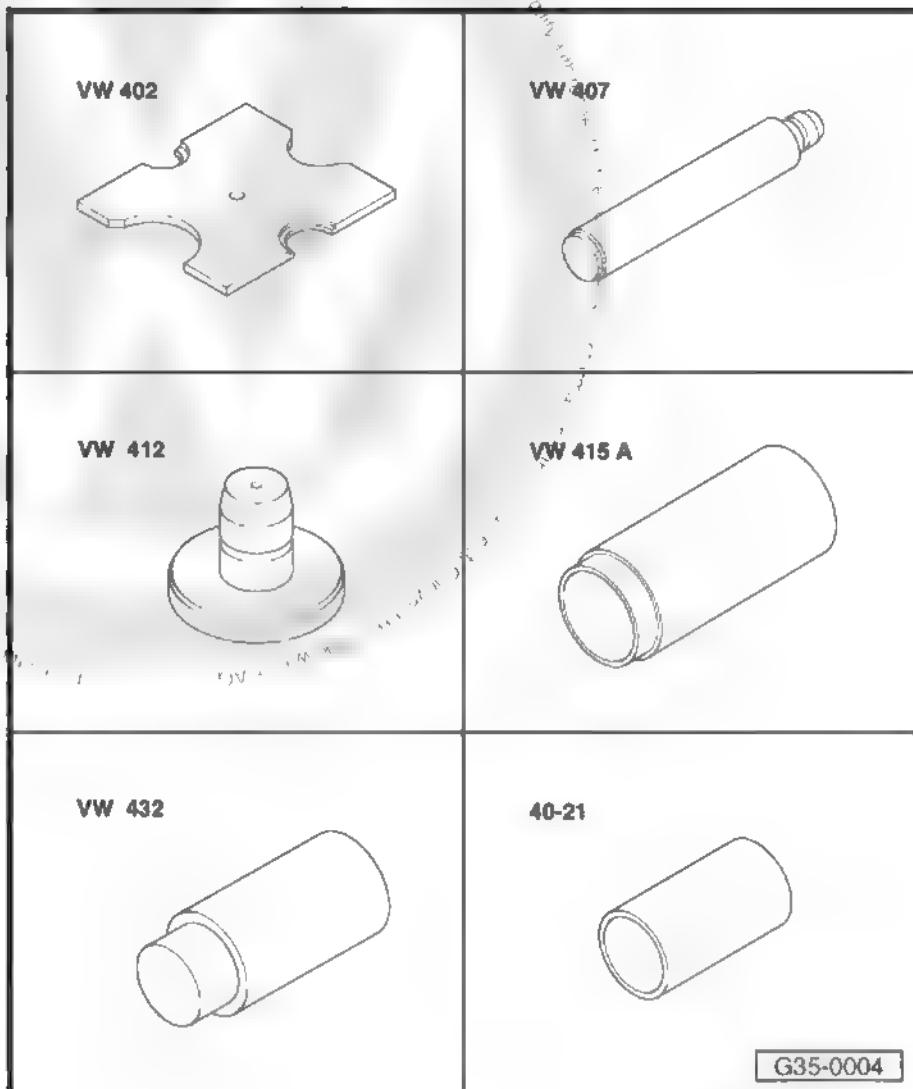


## 2

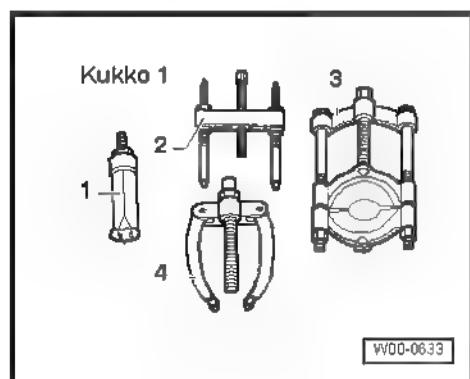
### Pinion shaft - disassemble and assemble

Special tools and workshop equipment required

- ◆ Thrust plate -VW 402-
- ◆ Pressure pin -VW 407-
- ◆ Pressure Disc -VW 412-
- ◆ Pressure tube -VW 415A-
- ◆ Thrust pad -VW 432-
- ◆ Support tube -40-21-



- ◆ -1- Puller 30 - 37 mm or VW 020P -Kukko 21/5-
- ◆ -4- Auxiliary support -KUKKO 22/1-





**Note**

- ◆ When installing new gears or a new pinion shaft, refer to technical data [page 1](#).
- ◆ Install all the roller bearings, gears and synchronizer rings on the primary shaft, lubricated with gear oil.
- ◆ Do not invert the synchronizer rings. When reusing synchronizer rings, always install them on the same gear pair.

**1 - Clutch case**

- Manufactured in aluminum or magnesium
- Allocation ⇒ Electronic Parts Catalogue (ETKA)
- Repair [page 78](#)
- In case of replacement, always adjust differential [page 122](#)
- Apply the Sealing putty - AMV 188 200 03- Evenly on the sealing surface of the transmission case.

**2 - Tapered roller bearing**

- With circlip.
- Removal [page 104](#)
- Installation [page 104](#)
- Installation position: the lock ring shall point to the direction of the pinion shaft.

**3 - Pinion shaft**

- Makes pair with the input shaft and both can only be replaced as a set.
- If there is an inside ring as tapered roller bearing housing, this should not be removed from the pinion shaft.
- If scratches or damages are detected on the roller bearing housing or inside ring, replace the pinion shaft and the tapered roller bearing as a set.

**4 - Gear for the 4<sup>th</sup>. gear**

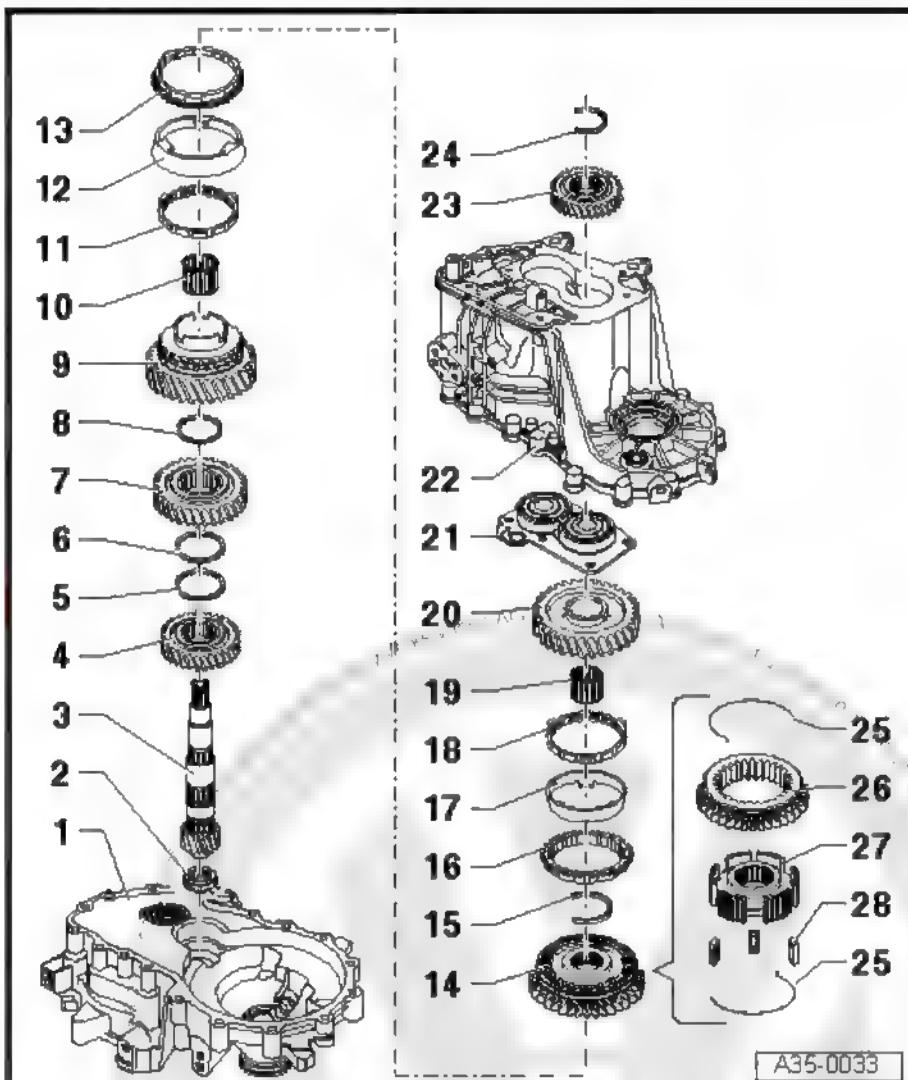
- Installation position: the hub must point to the 3<sup>rd</sup>. gear [page 105](#)

**5 - Circlip**

**6 - Circlip**

**7 - Gear for the 3<sup>rd</sup>. gear**

- Installation position: the hub must point to the 4<sup>th</sup> gear [page 105](#)





8 - Circlip

9 - Gear for the 2nd. gear

10 - Needle roller bearing

- For the 2nd. gear wheel.

11 - Inside ring for 2nd. gear

- Wear check ➔ [page 105](#)
- Installation position ➔ [page 106](#)

12 - Outside ring for 2nd. gear

- Install on inside ring ➔ [Item 11 \(page 103\)](#).
- Change in case of scratches or wear signs
- Installation position ➔ [page 106](#)

13 - Synchronizer ring for 2nd. gear

- Wear check ➔ [page 105](#)
- Installation position ➔ [page 106](#)

14 - Engaging sleeve with with the synchronizer for 1nd. and 2nd. gears

- Remove with 2nd. gear wheel after removing the circlip ➔ [page 105](#)
- Disassemble and assemble the engaging sleeve/synchronizer ring ➔ [page 106](#)
- Installation ➔ [page 107](#)

15 - Circlip

- Removal ➔ [page 104](#)
- Installation ➔ [page 107](#)

16 - Synchronizer ring for 1nd. gear

- Wear check ➔ [page 105](#)
- Install in order that the notches fit in the engaging sleeve limiters ➔ [Item 14 \(page 103\)](#).

17 - Outside ring for 1nd. gear

- Install on synchronizer ring ➔ [Item 16 \(page 103\)](#).
- Installation position ➔ [page 107](#)
- Change in case of scratches or wear signs.

18 - Inside ring for 1nd. gear

- Wear check ➔ [page 105](#)
- Check the flanges for wear signs.
- Installation position ➔ [page 107](#)

19 - Needle roller bearing

- For the 1nd. gear wheel.

20 - Gear for the 1nd. gear

- Installation position ➔ [page 108](#)

21 - Roller bearing support with ball bearing

- Change roller bearing support with ball bearing.
- Clean the threaded holes of the roller bearing support (e.g. Tap M6).
- Removal ➔ [page 95](#)
- Installation ➔ [page 98](#)

22 - Transmission case

- Manufactured in aluminum or magnesium
- Allocation ➔ Electronic Parts Catalogue (ETKA)
- Repair ➔ [page 78](#)



- In case of replacement, always adjust differential [page 122](#)
- Apply the Sealing putty -AMV 188 200 03- Evenly on the sealing surface of the transmission case Refer to the [Chemical Materials Manual](#)

#### 23 - Gear for the 5nd. gear

- Installation position: the hub must point to the side of the gearbox housing [page 76](#)

#### 24 - Circlip

- Replace whenever removed
- Determine thickness [page 77](#).

#### 25 - Spring

- Installation position [page 106](#)

#### 26 - Engaging sleeve

#### 27 - Synchronizer

#### 28 - Retainers

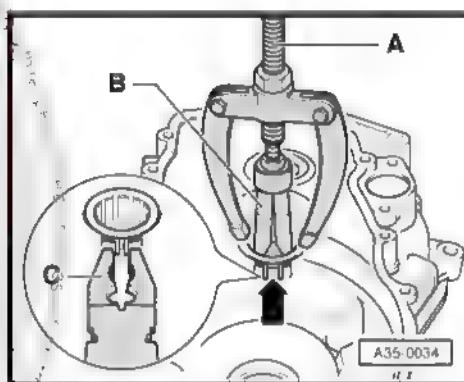
- 3 units.

#### Removing tapered roller bearing on clutch case

A - Auxiliary support -KUKKO 22/1-

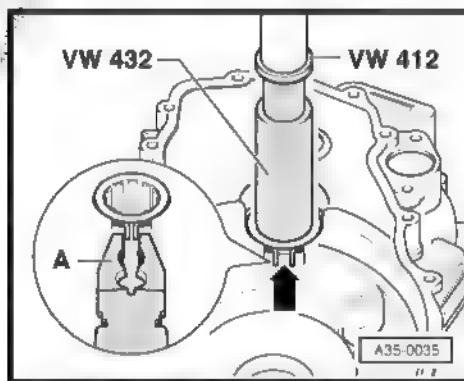
B - Puller 30 - 37 mm or VW 020P -Kukko 21/5-

- When removing it, compress the bearing circlip -arrow- with pliers -C-.



#### Installing the tapered roller bearing on clutch case

- Support the clutch case by placing the Pressure tube -VW 416A- (does not appear in the pic.) directly under the bearing bracket.
- When installing, compress the bearing circlip -arrow- with pliers -A-.
- Remove the pliers just before the bearing is in the correct installation position. The circlip shall be locked in the clutch case hole.



#### Removing circlip -1- from notch

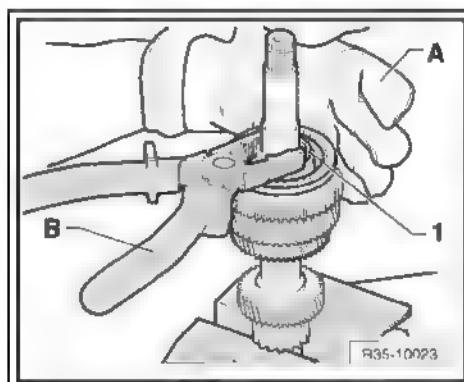
A - Safety sleeve

B - Multi-purpose pliers



**WARNING**

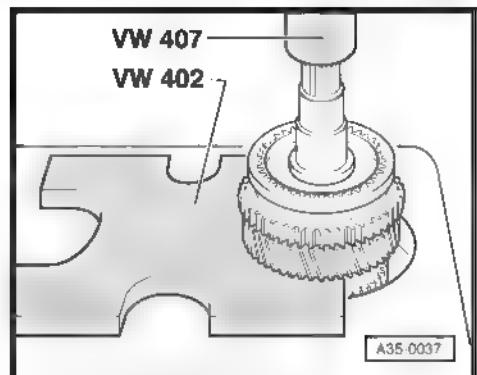
*Avoid uncontrolled motions of circlip.*





### Removing the locking collar/synchro hub of the 1nd. and 2nd gears

- After removing the circlip, disengage with the moving wheel of the 2nd. gear and the engaging sleeve with synchronizer.



### Installation position of 3rd. and 4nd. gears

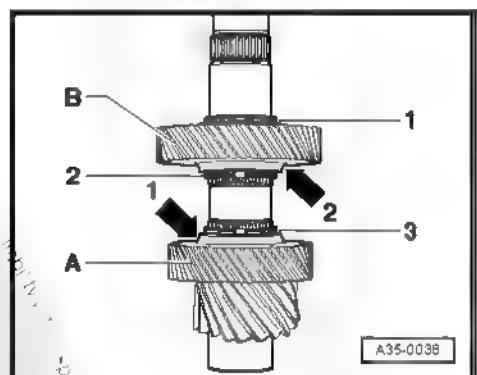
- Install 4nd. gear -A- on pinion shaft.

The collar -arrow 1- shall face the 3nd. gear -B-.

- Install circlips -2- and -3-.
- Install 3nd. gear -B- on pinion shaft.

The hub -arrow 2- shall face the 4nd. gear -A-.

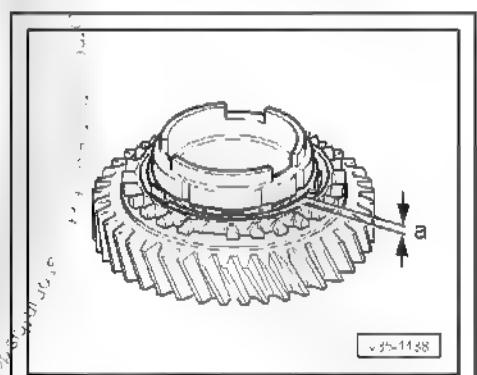
- Install circlip -1-.



### Checking the wear on the synchronizer ring of 1nd. and 2nd. gears

- Press the inside ring against the gear cone and measure the distance -nd- with a feeler gauge.

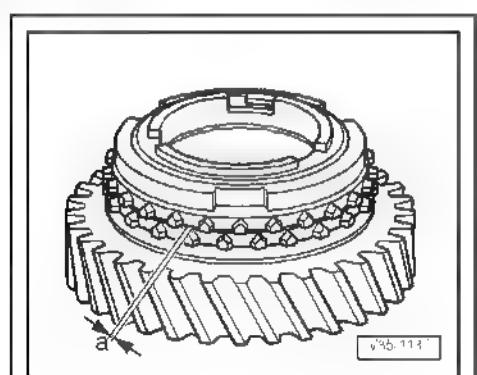
Distance -nd-	New part	Wear limit
1st and 2nd gears	0,75 ... 1,25 mm	0,3 mm



### Checking the wear on the synchronizer ring of 1nd. and 2nd. gears

- Press the synchronizer ring, internal and external tracks against the gear cone and measure the distance -nd- with a feeler gauge

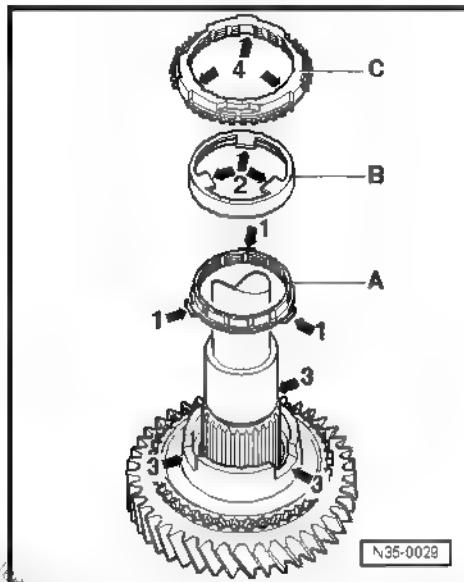
Distance -nd-	New part	Wear limit
1nd. and 2nd. gears	1,2 ... 1,8 mm	0,5 mm





#### Installation position of the outside and inside rings of the 2nd. gear

- Install inside ring -A- on the 2nd gear wheel. The curve shoulders -arrow 1- shall face the outside ring -B-
- Install the outside ring over -B-. The flanges -arrow 2- shall fit in the grooves -arrow 3- of the gear.
- Install the synchronizer ring over -C-. The grooves -arrow 4- shall fit in the relieves -arrow 1- on inside ring -A-.



#### Disassembling and assembling engaging sleeve with 1nd. and 2nd. gears

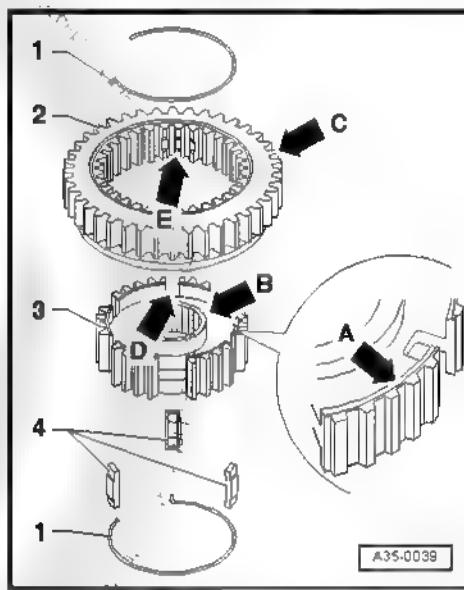
- 1 - Spring
- 2 - Engaging sleeve
- 3 - Synchronizer
- 4 - Limiter

- Press the engaging sleeve on the synchronizer.

The notch on front face -arrow A- and the wide collar -arrow B- shall face the external teeth on the engaging sleeve -arrow C- after installing.

The deeper grooves -arrow D- for the limiters located on the synchronizer shall match the notches -arrow E- on the engaging sleeve.

- Install the limiters in the deeper grooves -arrows-.



#### Assembly of the locking collar/synchro hub of the 1nd. and 2nd. gears

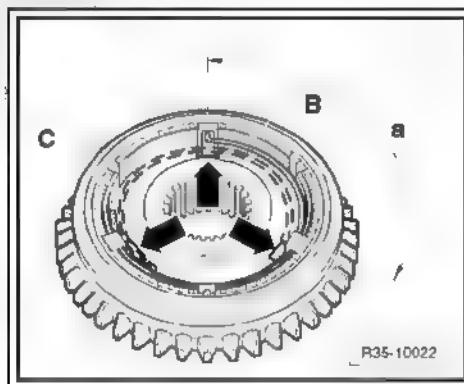
- Press the engaging sleeve on the synchronizer.
- Install the limiters in the deeper grooves -arrows-.
- Install springs -B- and -C- at -nd-.



Note

-nd- = 120°

- The folded end of the spring shall fit into the limiter's hole.

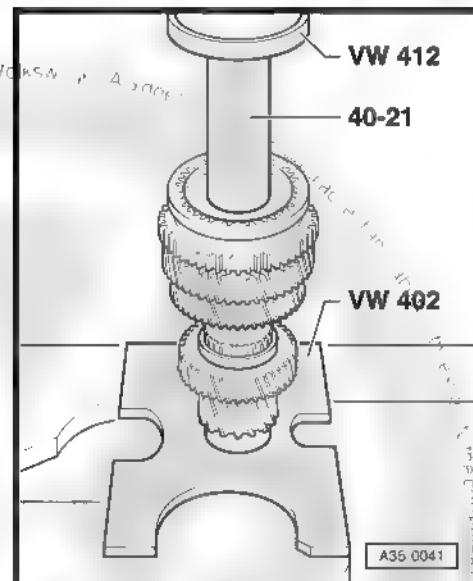




### Installation of the locking collar/synchro hub of the 1nd. and 2nd. gears

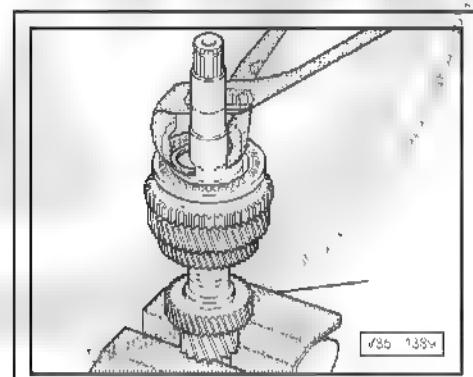
Installation position: The notch for the selection fork located on the engaging sleeve shall face the 1nd. gear and the teeth for reverse gear towards 2nd. gear wheel

- Turn the synchronizer ring in order to match flanges and limiters.



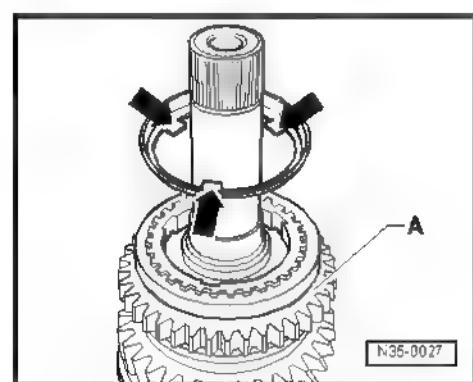
### Installing circlip

- Install the 1nd. gear circlip on the engaging sleeve/synchronizer.



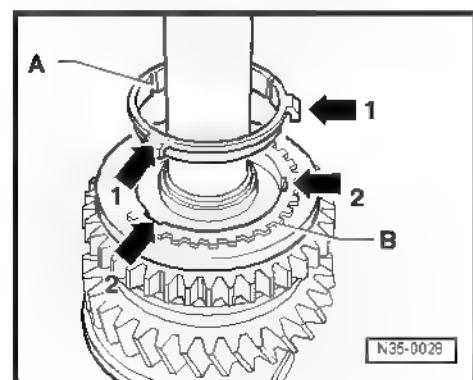
### Installation position of the 1nd. gear

The flanges -arrows- shall face the teeth for reverse gear.



### Installation position of the inside ring of the 1nd. gear -A-

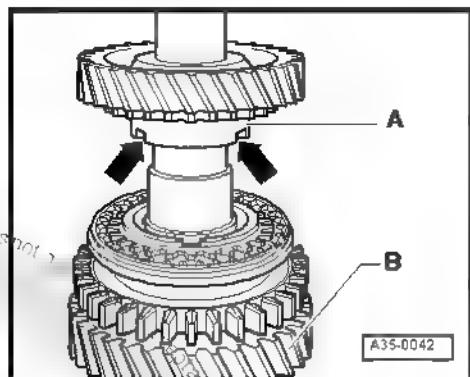
The flanges -arrow 1- fit in the notches -arrow 2- on synchronizer ring -B-





Installation position for 1nd. gear

The tall collar -A- shall face the 2nd. gear -B-. The collar notches -arrows- fit on the outside ring flanges -arrow-.





## 39 – Transmission shafts, differential

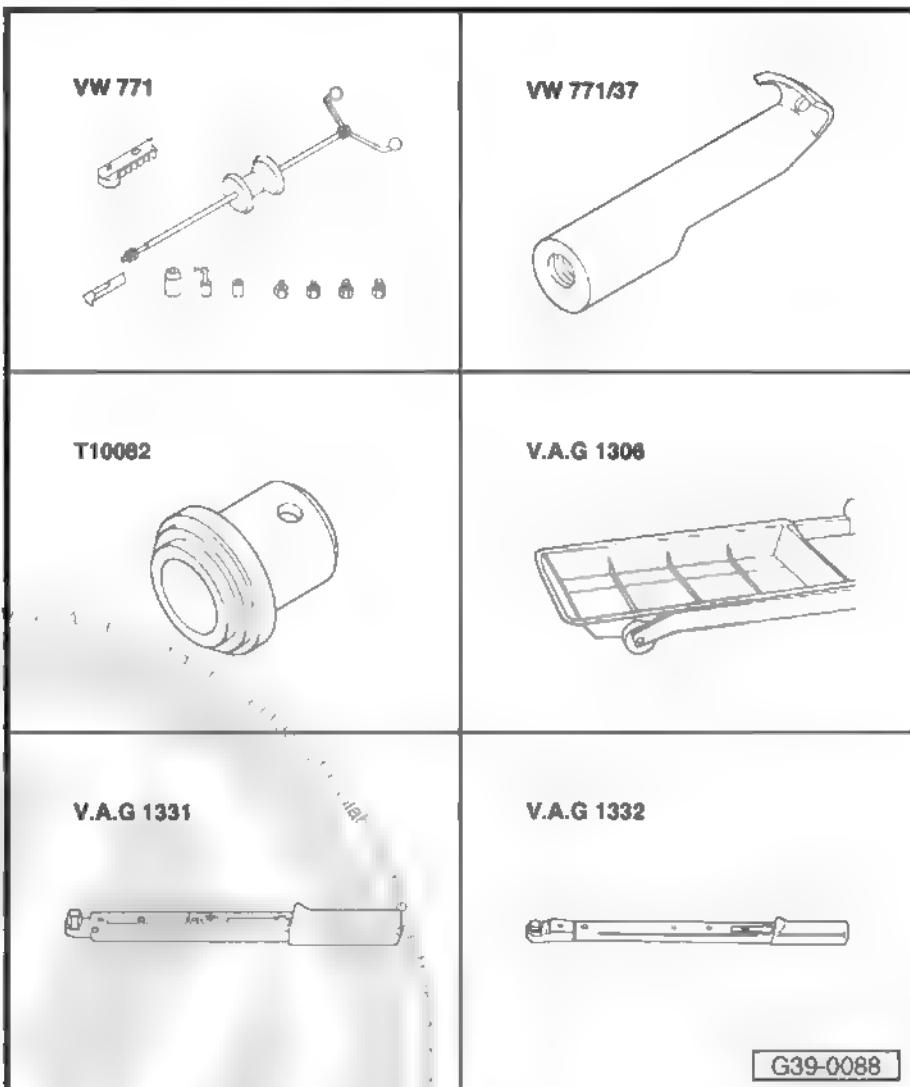
### 1 Retainer for the propelling flange - replace

(Transmission installed)

#### 1.1 Left propelling flange retainer - replace

Special tools and workshop equipment required

- ◆ Bushing and bearing extractor -VW 771-
- ◆ Complement -VW 771/37-
- ◆ Pressure shim -T 10080-
- ◆ Drip tray -VAG 1306-
- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-
- ◆ Torquemeter - 40 to 200 Nm (socket 1/2") -VAG 1332-

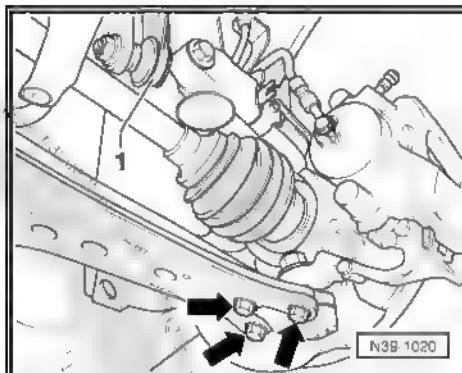


#### 1.1.1 Removal

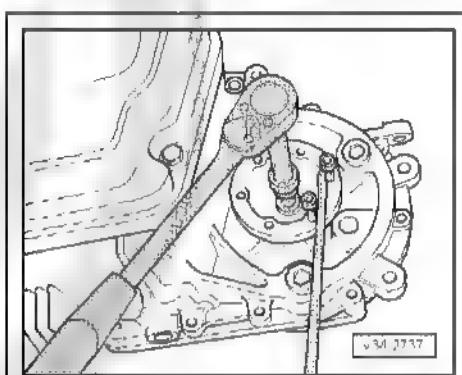
- Remove left side wheel.
- Remove noise insulation ⇒ Body - external mountings, Rep Gr. 66 ; Wheel housing liner - remove and install .
- Turn the steering wheel to the left stop.*
- Remove drive semi-shaft from the transmission propelling flange ⇒ Running gear, ??axles, ??steering; Rep Gr 40 , Drive semi-shafts - remove and install .



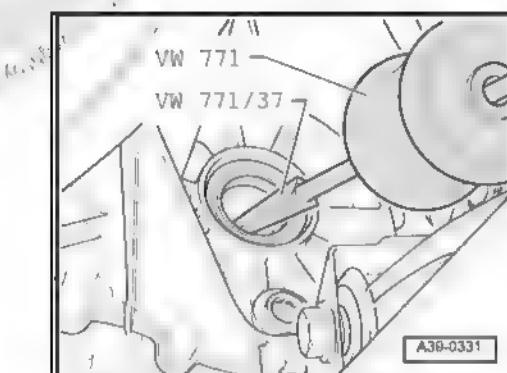
- Mark the installation position of the screws -arrows-.
- Remove screws -arrows- ⇒ Rep. Gr. 40 ; Articulated shaft - remove and install .
- Remove the coupling rod -1- from the stabilizer, if applicable ⇒ Rep. Gr. 40 ;
- Place the drive semi-shaft upwards and fasten it with wire on the suspension pillar



- Remove the propelling flange fastening screw by using two screws to lock the flange with a lever.
- Place a Drip tray -VAG 1306- under the transmission.
- Remove the propelling flange with the spring.

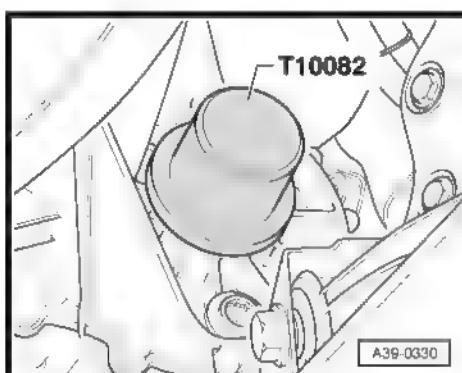


- Remove the propelling flange retainer with the Bushing and bearing extractor -VW 771- and Complement -VW 771/37- .



### 1.1.2 Installation

- Install the new retainer to the stop, without tilting it.
- Fill the half space between the sealing lip and the bellows with Grease -G 052 182 A1- ⇒ Refer to Chemicals Manual .
- Install the propelling flange, fastening it with the tapered screw.
- Install drive semi-shaft on the transmission propelling flange ⇒ Running gear, ??axles, ??steering; Rep. Gr. 40 ; Drive semi-shafts - remove and install .
- Check hydraulic oil level and replenish, if necessary ⇒ page 63 .
- Install noise insulation ⇒ Body - external mountings; Rep. Gr. 66 ; Wheel housing liner - remove and install .
- Install the wheel.

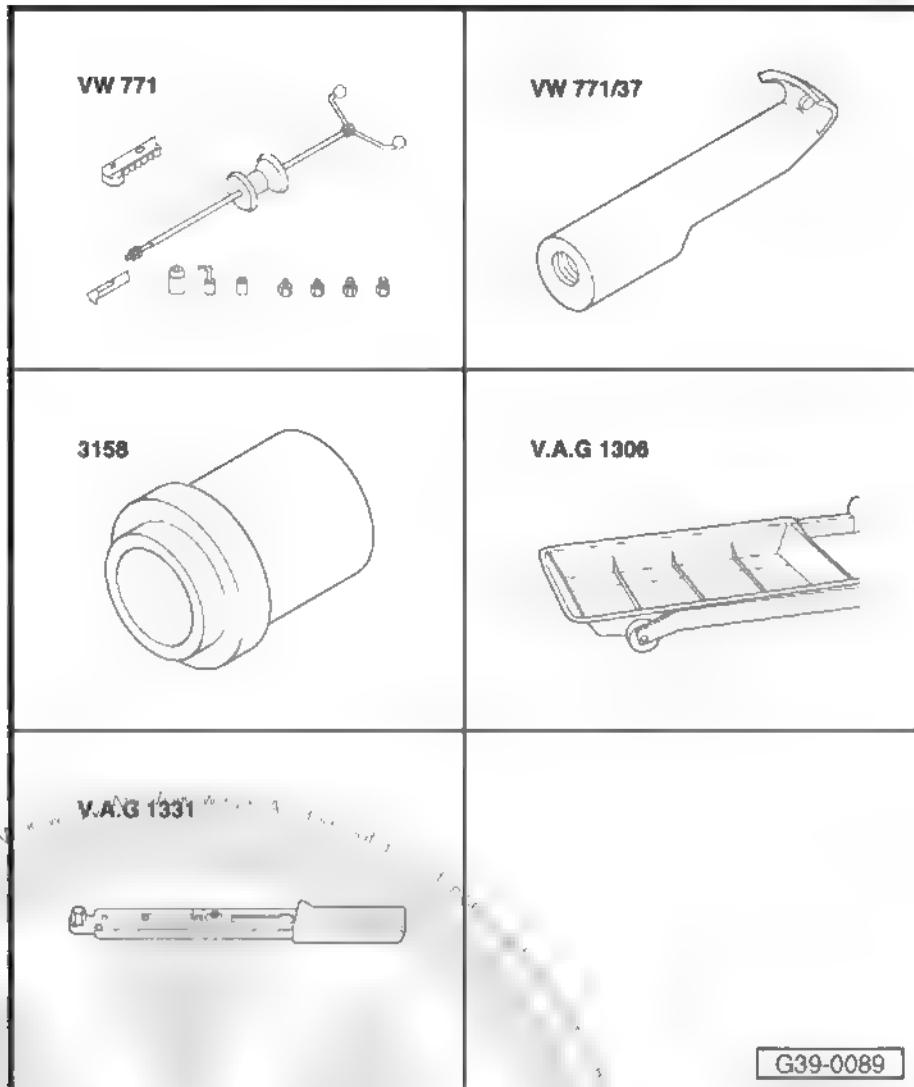


### 1.2 Right propelling flange retainer - replace



#### Special tools and workshop equipment required

- ◆ Bushing and bearing extractor -VW 771-
- ◆ Complement -VW 771/37-
- ◆ Fitting sleeve -3158-
- ◆ Drip tray -VAG 1306-
- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-



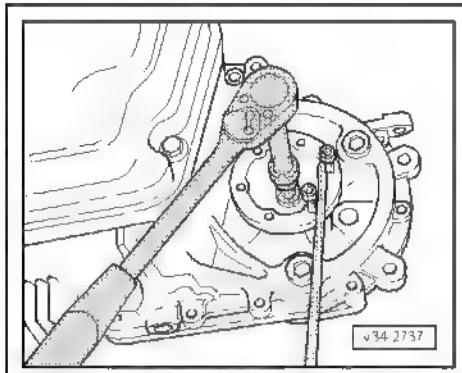
G39-0089

#### 1.2.1 Removal

- Remove noise insulation ⇒ Body - external mountings; Rep. Gr. 66 ; Wheel housing liner - remove and install .
- Turn the steering wheel to the right stop.
- Remove drive semi-shaft from the transmission propelling flange ⇒ Running gear, ??axles, ??steering; Rep. Gr. 40 ; Drive semi-shafts - remove and install .
- Place the drive semi-shaft upwards and fasten it with wire on the suspension pillar



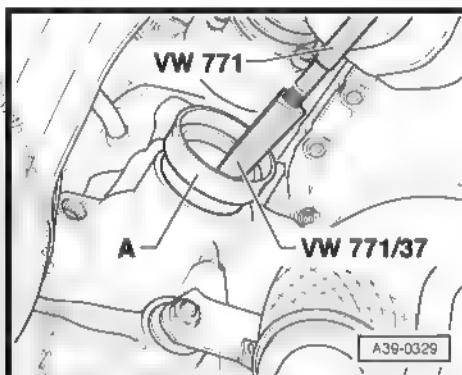
- Remove the propelling flange fastening screw by using two screws to lock the flange with a lever.
- Place a Drip tray -VAG 1306- under the transmission.
- Remove the propelling flange with the spring.



- Remove the propelling flange retainer with the Bushing and bearing extractor -VW 771- and Complement -VW 771/37- .

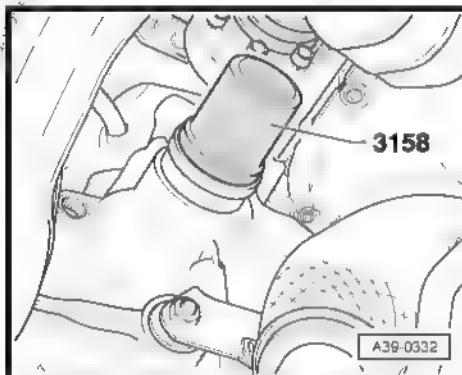
Note

- ◆ *Do not damage retainers -A-; otherwise, leaks may occur.*
- ◆ *Replace the retainer, if damaged.*



## 1.2.2 Installation

- Install the new retainer to the stop, without tilting it.
- Fill the half space between the sealing lip and the bellows with Grease -G 052 182 A1- ⇒ Refer to Chemicals Manual .
- Install the propelling flange, fastening it with the tapered screw.
- Install drive semi-shaft on the transmission propelling flange ⇒ Running gear ??axles, ??steering; Rep. Gr. 40 , Drive semi-shafts - remove and install .
- Check hydraulic oil level and replenish, if necessary ⇒ page 63 .
- Install noise insulation ⇒ Body - external mountings; Rep. Gr. 66 ; Wheel housing liner - remove and install .



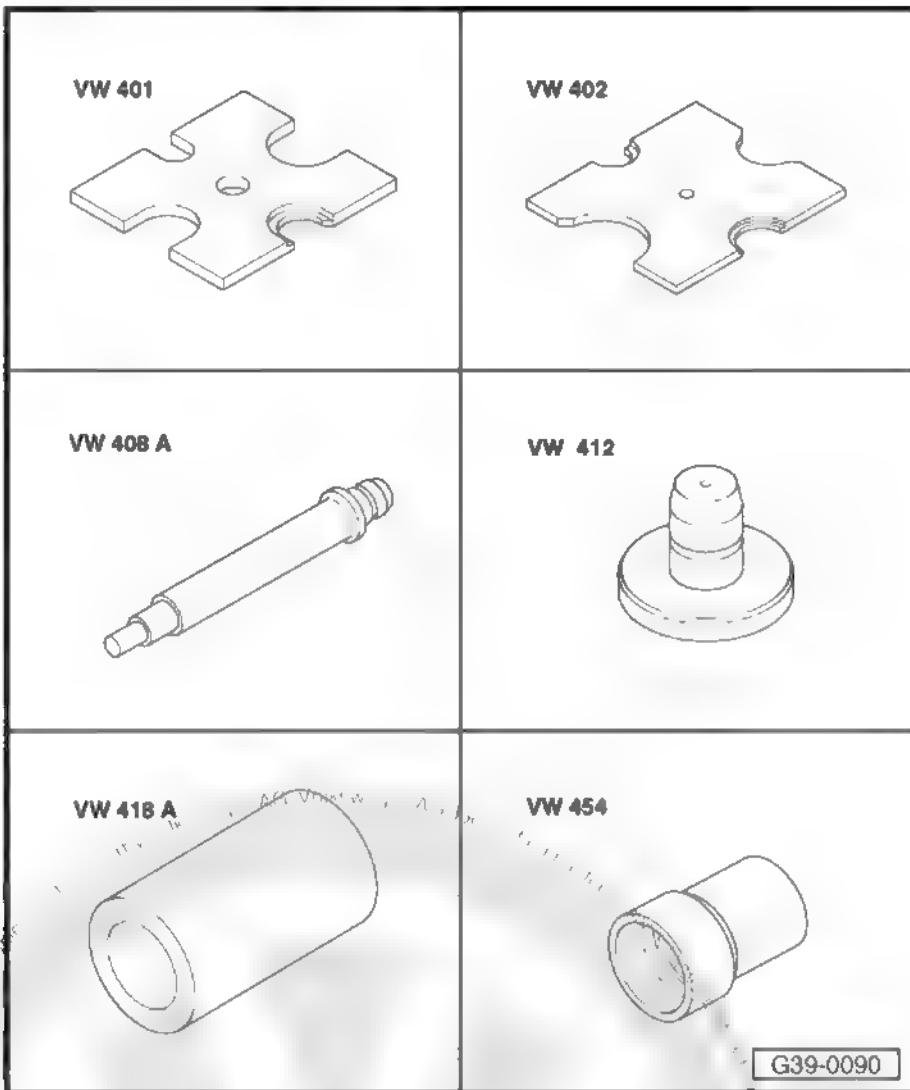


## 2 Differential - repair

### 2.1 Differential - disassemble and assemble

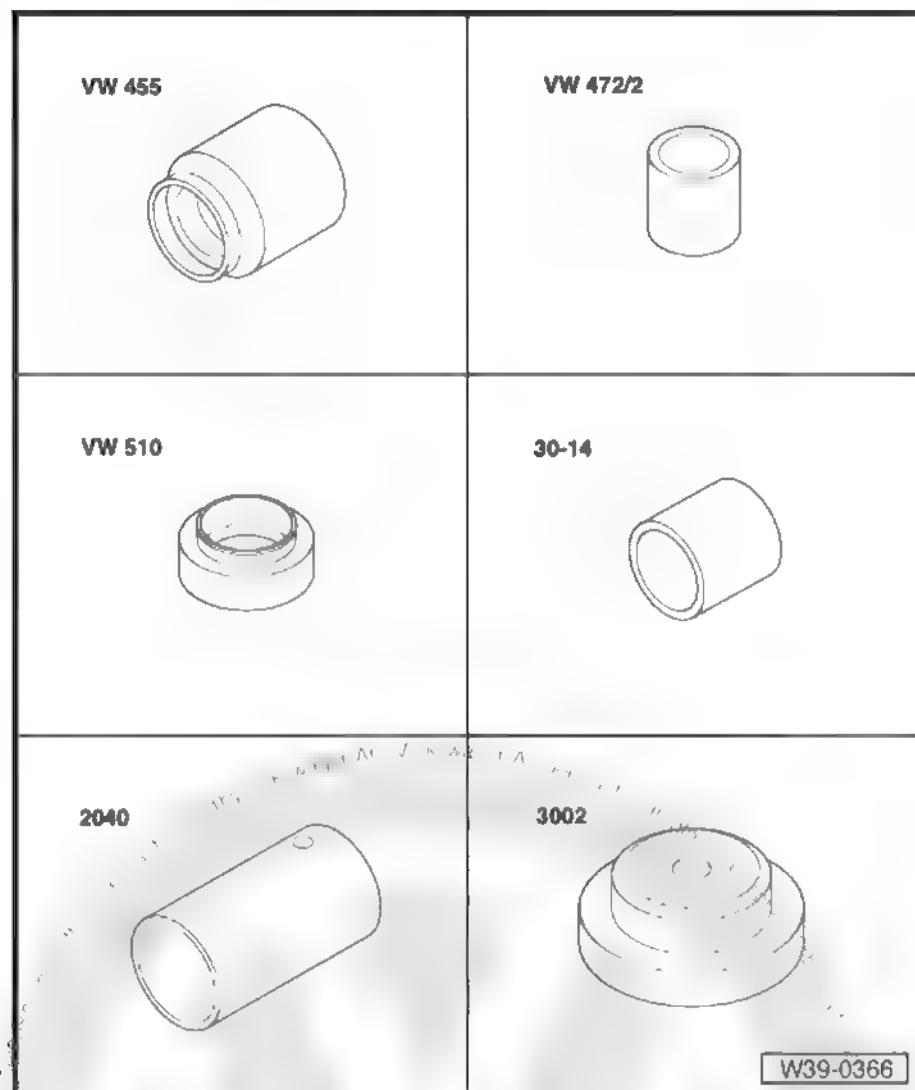
Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Pressure pin -VW 408A-
- ◆ Pressure Disc -VW 412-
- ◆ Pressure tube -VW 418A-
- ◆ Pressure tube -VW 454-



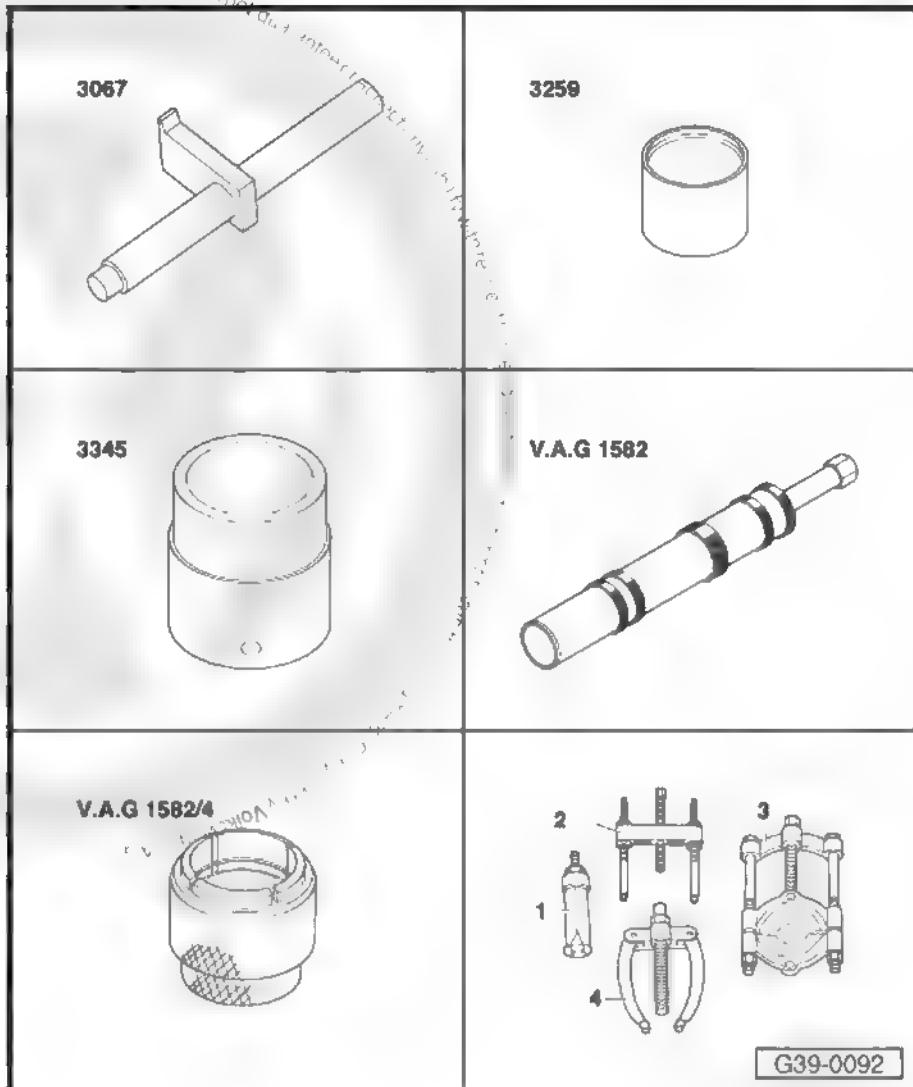


- ◆ Fitting tool -VW 455-
- ◆ Sleeve -VW 472/2-
- ◆ Thrust pad -VW 510-
- ◆ Extractor tube -30-14-
- ◆ Tube -2040-
- ◆ Pressure base or 3002 -VW 3002-



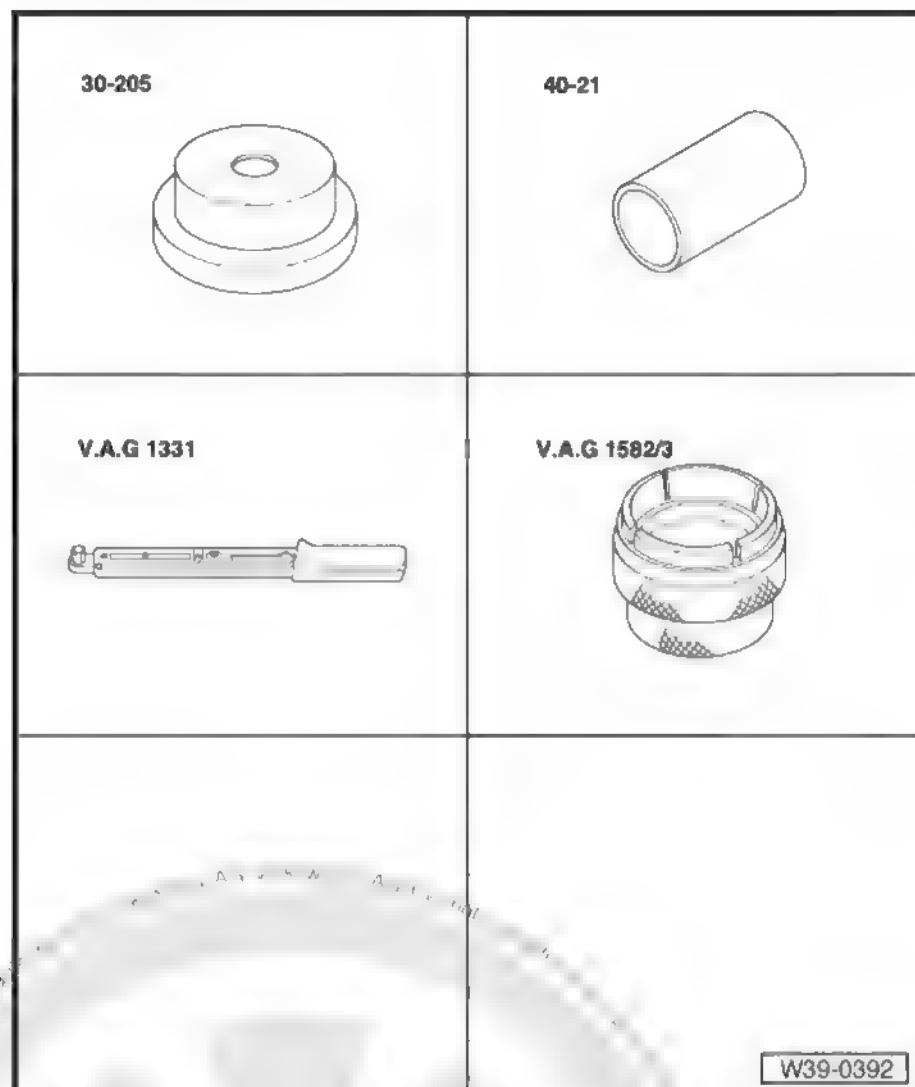


- ◆ Latch -3067-
- ◆ Tube -3259-
- ◆ Fitting tool -3345-
- ◆ Bearing extractor -VAG 1582-
- ◆ Caliper -VAG 1582/4-
  - 1- Extractor 46 - 56 mm or VW 020T -Kukko 21/7-
- ◆ -4- Auxiliary support -KUK-KO 22/2-





- ◆ Pressure base or VW 062-30-205-
- ◆ Support tube -40-21-
- ◆ Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-
- ◆ Caliper -VAG 1582/3-



Note

- ◆ Heat inside ring on the tapered roller bearing to 100 °C before installing.
- ◆ Always change both tapered roller bearings as a set
- ◆ Adjust the differential when replacing the tapered roller bearings, differential case, transmission case or clutch case  
⇒ page 122 .



**1 - Tapered screw**

- 25 Nm
- Fasten on the threaded part  
→ [Item 8 \(page 117\)](#).

**2 - Right propelling flange**

- Do not invert. The right and left propelling flanges are different.

**3 - Pressure spring for propelling flange**

- Installed behind the propelling flange.

**4 - Sealing washer**

- Installation position: lip faces pressure spring.

**5 - Tapered ring**

- Installation position: taper towards differential housing.

**6 - Circlip**

- retains the tapered ring, sealing washer and spring in position when the propelling flange is removed.

**7 - Planetary gear**

- Installation → [page 121](#)

**8 - Flanged shaft nut**

- Installation → [page 121](#)

**9 - Satellite shaft**

- To remove, cut the elastic pin → [Item 18 \(page 118\)](#) → [page 120](#)
- Installation → [page 121](#)

**10 - Satellite**

- Installation → [page 121](#)

**11 - Stop cover for satellite gears**

- Install lubricated with transmission oil.

**12 - Left propelling flange**

- With retainer plate.
- Do not invert. The right and left propelling flanges are different.

**13 - Retainer for the left propelling flange**

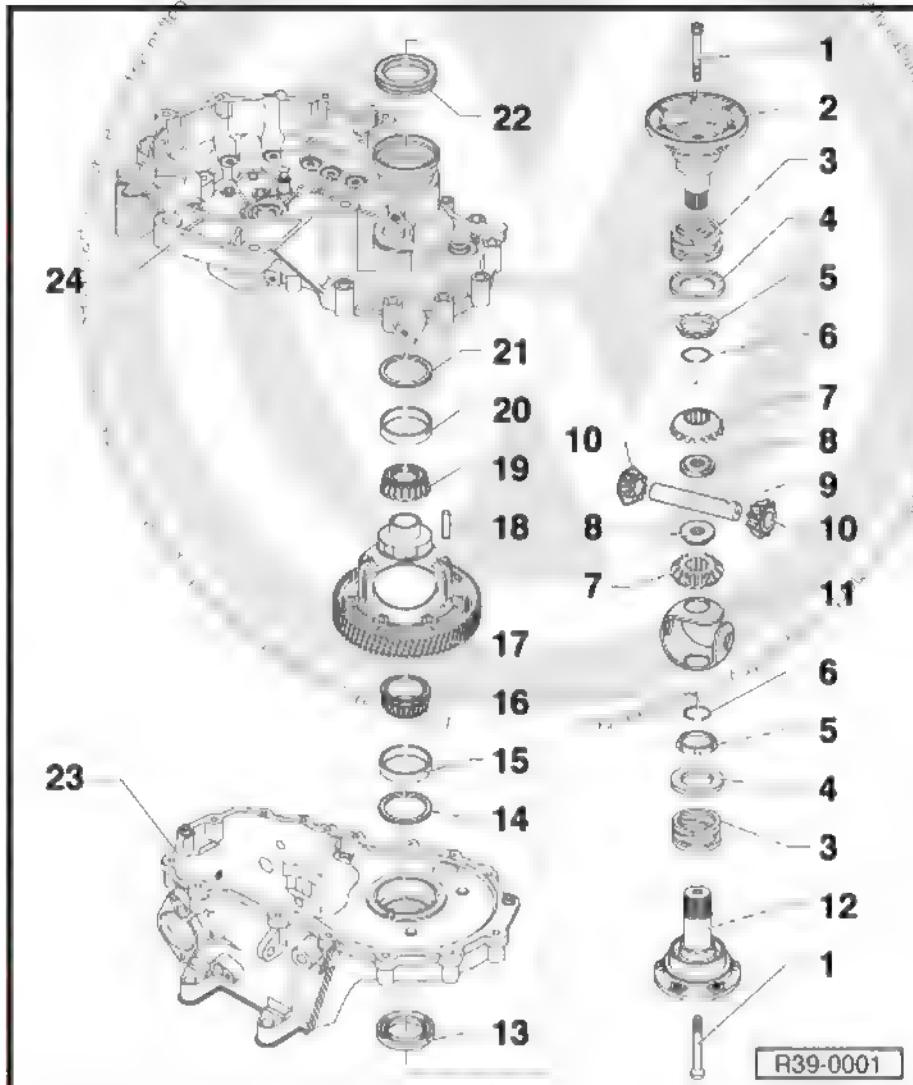
- Left and side diameters are different.
- Replace → [page 109](#).

**14 - Adjustment shim S1**

- For the differential.
- Always with 1-mm thickness.

**15 - Outside ring on the tapered roller bearing**

- Removal → [page 118](#)
- Installation → [page 119](#)





16 - Tapered roller bearing

- Removal [⇒ page 120](#)
- Installation [⇒ page 120](#)

17 - Differential box

- With riveted differential master gear.
- If it is necessary to replace it, the pinion shaft shall also be replaced [⇒ Item 3 \(page 102\)](#).

18 - Elastic pin

- To fasten satellite shaft.

19 - Tapered roller bearing

- Removal [⇒ page 119](#)
- Installation [⇒ page 120](#)

20 - Outside ring on the tapered roller bearing

- Removal [⇒ page 119](#)
- Installation [⇒ page 119](#)

21 - Adjustment shim S<sub>2</sub>

- For the differential.
- Determine thickness [⇒ page 122](#).

22 - Retainer for the right propelling flange

- Left and side diameters are different.
- Replace [⇒ page 109](#).

23 - Transmission case

- Manufactured in aluminum or magnesium
- Allocation ⇒ Electronic Parts Catalogue (ETKA)
- Repair [⇒ page 78](#)
- In case of replacement, always adjust differential [⇒ page 122](#)
- Apply the Sealing putty -AMV 188 200 03- Evenly on the sealing surface of the transmission case. Refer to the ⇒ Chemical Materials Manual

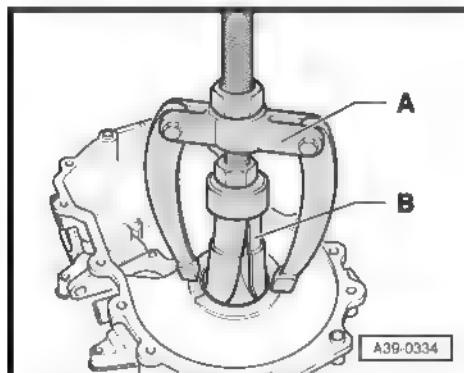
24 - Clutch case

- Manufactured in aluminum or magnesium
- Allocation ⇒ Electronic Parts Catalogue (ETKA)
- Repair [⇒ page 78](#)
- In case of replacement, always adjust differential [⇒ page 122](#)
- Apply the Sealing putty -AMV 188 200 03- Evenly on the sealing surface of the transmission case.

Removing the outside ring on the tapered roller bearing of the transmission case

A - Auxiliary support -KUKKO 22/2-

B - Extractor 46 - 56 mm or VW 020T -Kukko 21/7-

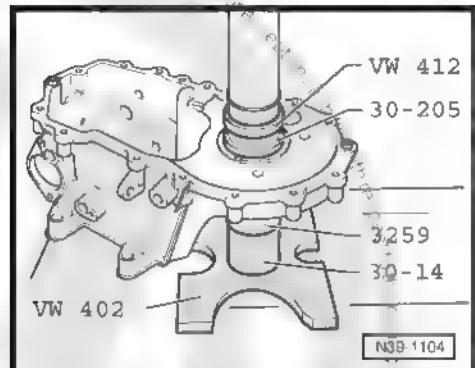




### Installing the outside ring of the tapered roller bearing on the transmission case

#### Note

- ◆ Install adjustment shim  $S_1$  (1 mm standard) below the external roller bearing ring if it has been disassembled.
- ◆ Adjustment shim  $S_1$  is used only in some transmission housings → Item 14 (page 137)
- Support the transmission case by placing the Tube -3259- directly below the bearing support.

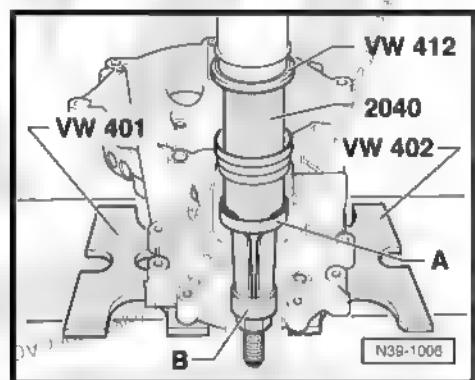


### Removing the outside ring of the tapered roller bearing -A- of the clutch case

- Using Extractor 46 - 56 mm, or VW 020T -Kukko 21/7- -B- to remove the outside ring from the tapered roller bearing.

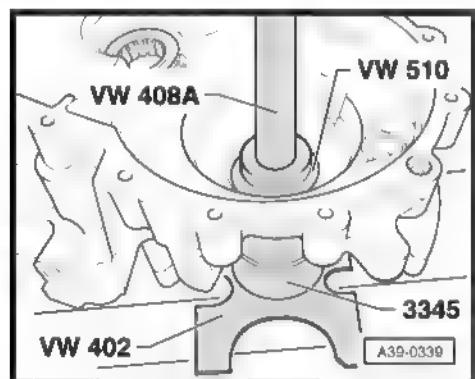
#### Note

Remove the Speed sensor -G22- before removing the outside ring from the tapered roller bearing.



### Installing the outside ring on the tapered roller bearing of the clutch case

- Support the clutch case by placing the Fitting tool -3345- directly below the bearing support.
- Install the Speed sensor -G22- after installing the outside ring of the bearing.

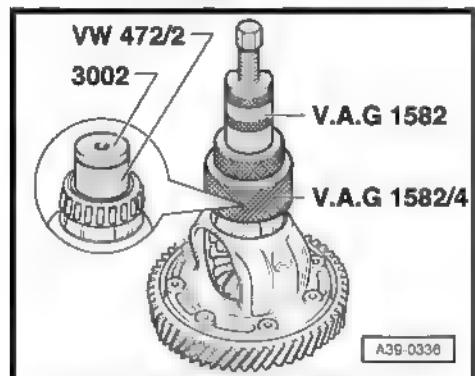


### Removing the inside ring from the tapered roller bearings

- Before installing the extractor, install the Sleeve -VW 472/2- - VW 472/2- and the Pressure base or VW 3002 -3002- on the differential case.

#### Note

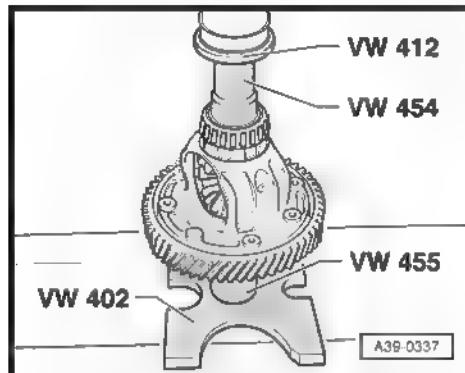
The internal tracks on both roller bearings are removed in an identical way as for the differential case.





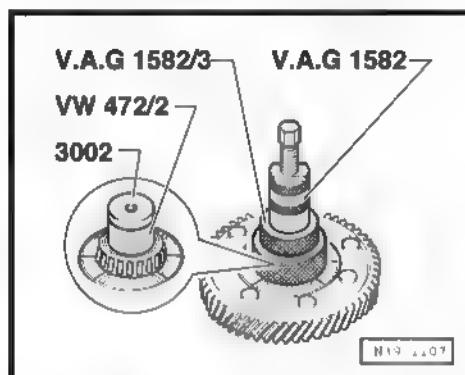
#### Installing the inside ring on the tapered roller bearings

- Support the internal track on the opposite side with the pressing bushing -VW 455-



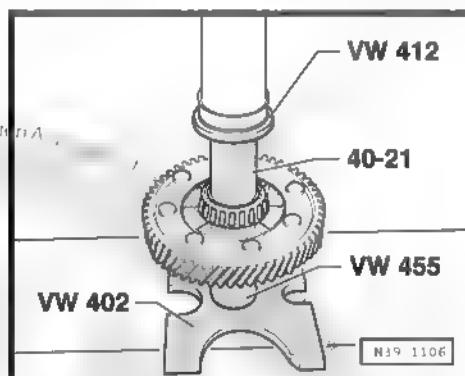
#### Removing the inside ring from the tapered roller bearing

- Before mounting the pulling device, place the Sleeve -VW 472/2- and the Pressure base or VW 3002 -3002- in the planetary gear box.



#### Installing the inside ring on the tapered roller bearing

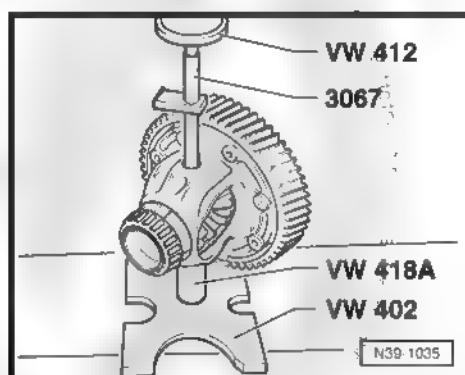
- Support the inside ring on the opposite side with the Fitting tool -VW 455- .



#### Removing the satellite shaft

Cut the elastic pin to remove the shaft.

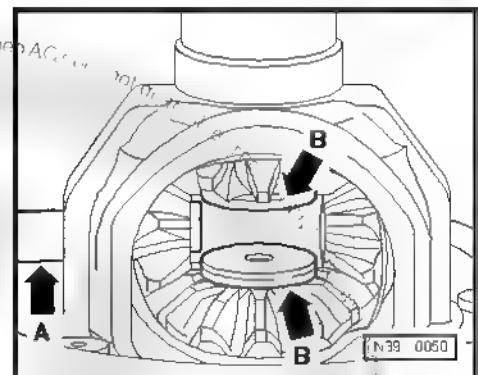
- Remove the elastic pin remains from the differential case.





#### Installing the planetary and satellite gears

- Lubricate the stop cover of the satellite gears with transmission oil
- Install the two planetary gears and lock them (for example, with the propelling flange).
- Install the satellite gears displaced by 180°
- Install the satellite shaft -arrow A- to the first satellite
- Install nuts -arrows B- on the planetary gears. Installation position: edge facing planetary gear
- Install the satellite shaft to the stop and fasten it with the elastic pin

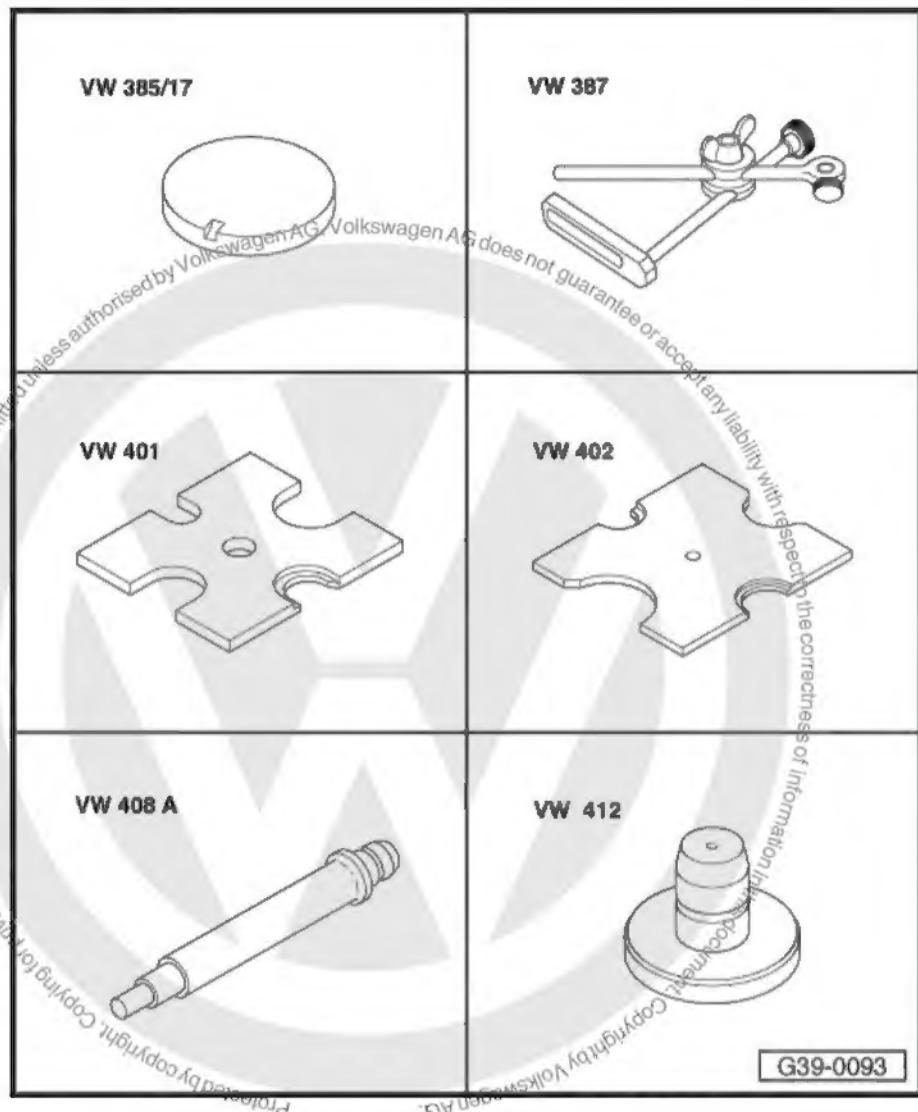




### 3 Differential - adjust

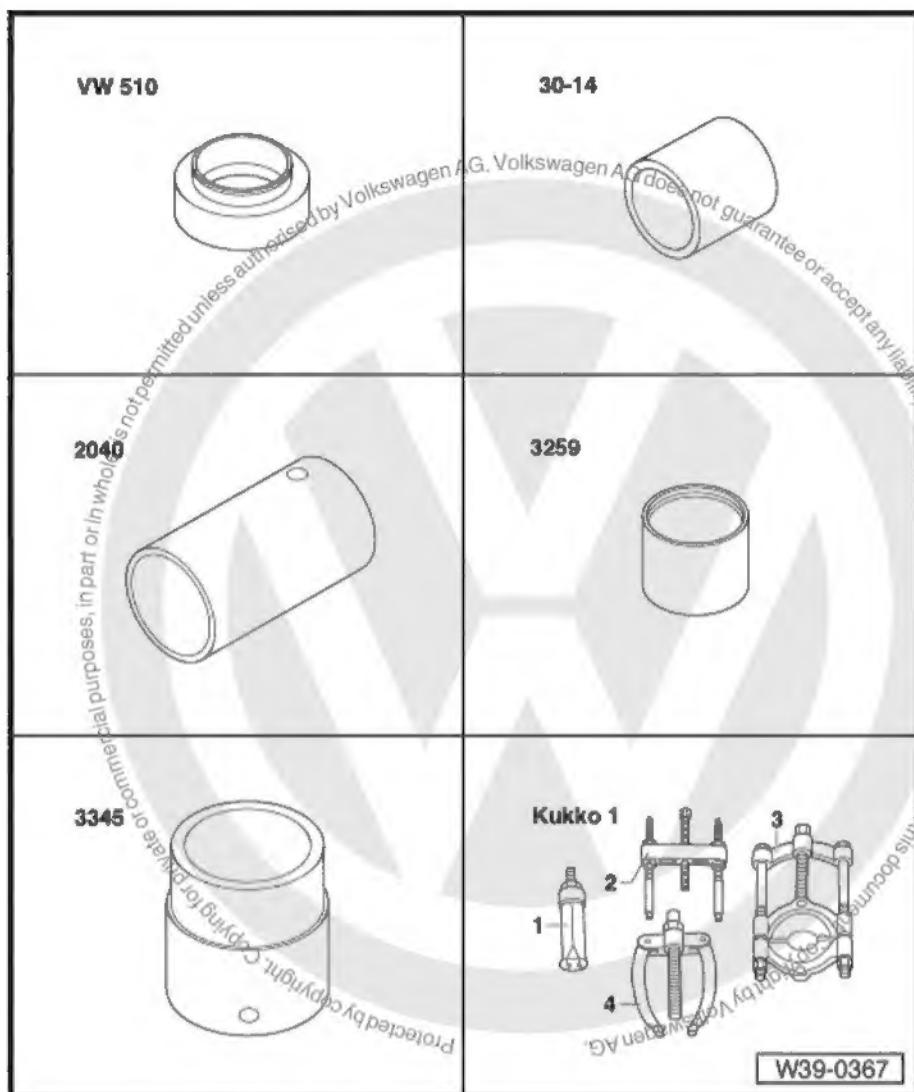
Special tools and workshop equipment required

- ◆ Measuring disc or VW 385 -VW 385/17-
- ◆ Support -VW 387-
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Pressure pin -VW 408A-
- ◆ Pressure Disc -VW 412-





- ◆ Thrust pad -VW 510-
- ◆ Extractor tube -30-14-
- ◆ Tube -2040-
- ◆ Tube -3259-
- ◆ Fitting tool -3345-
- ◆ -1- Extractor 46 - 56 mm or  
VW 020T -Kukko 21/7-



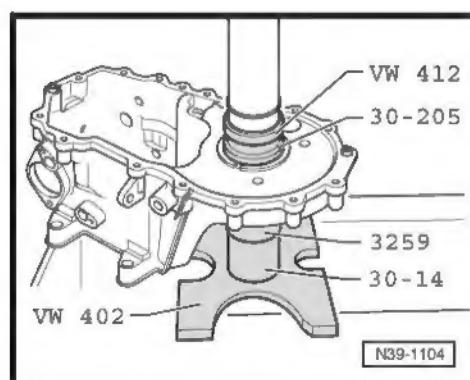
The differential shall be adjusted when replacing the following components:

- ◆ Transmission case
- ◆ Clutch case
- ◆ Differential box
- ◆ Tapered roller bearings of the differential
- Install the outer conical cylinder bearing ring (pinion side) with adjustment shim S<sub>1</sub> (always 1 mm thick) on the transmission casing.



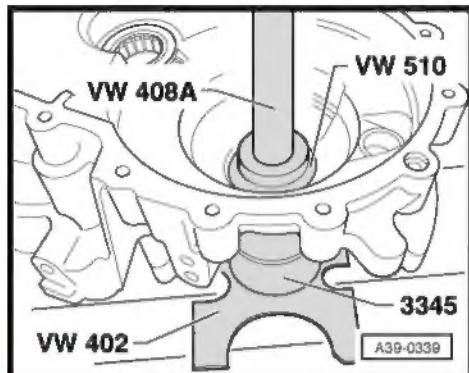
Note

*The inside and outside tracks of the tapered roller bearings form an assembly (pairs) and should not be inverted.*





- Install the outside ring of the tapered roller bearing (opposite side of pinion) on the clutch case without adjustment shim.
- Install the differential on the clutch case.
- Install the transmission case and tighten the 5 screws to the corresponding tightening torque [⇒ Item 3 \(page 68\)](#)



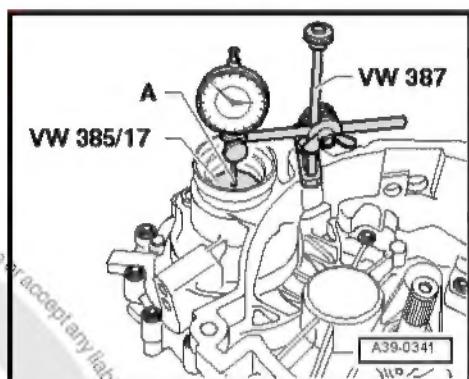
- Install the measuring device and the dial gauge by using an extender -A- of approx. 30 mm.
- Reset the dial gauge to zero with 1-mm pre-tension.
- Move differential up and down and recall play indicated on dial gauge and record it (in example: 1.50 mm).

#### Determine adjustment shim thickness S<sub>2</sub>

The pre-tension required for the roller bearing is achieved by adding a constant pressure value (0.35 mm) to the value achieved during the measurement for S<sub>2</sub>.

Example:

Measured value	1.50 mm
+ pressure (constant value)	0.35 mm
Adjustment shim S thickness <sub>2</sub> =	1.85 mm





- Remove the clutch case and the outside ring of the tapered roller bearing -A-

B - Extractor 46 - 56 mm or VW 020T -Kukko 21/7-

- Install adjustment shim S<sub>2</sub> with the corresponding thickness (in the example, 1.85 mm) and reinstall the outside ring of the tapered roller bearing in the clutch case ➔ [page 119](#)

The following adjustment shims are available:

Thickness (mm)	Replacement parts No.
0,65	02K 409 210
0,70	02K 409 210 A
0,75	02K 409 210 B
0,80	02K 409 210 C
0,85	02K 409 210 D
0,90	02K 409 210 E
0,95	02K 409 210 F
1,00	02K 409 210 G
1,05	02K 409 210 H
1,10	02K 409 210 J
1,15	02K 409 210 K
1,20	02K 409 210 L
1,25	02K 409 210 M
1,30	02K 409 210 N
1,35	02K 409 210 P
1,40	02K 409 210 Q

The existence of different tolerances enables calibrating the required shim thickness with accuracy.

If the required thickness for the adjustment shim is greater than that indicated on the table, install 2 shims which thickness sum is equivalent.

- Install the transmission case and tighten the screws to the recommended tightening torque ➔ [Item 3 \(page 68\)](#).

05.11

